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## Journal of the Society of Arts.

FRIDAY, DECEMBER 21, 1860.

### EXAMINATIONS, 1861.—NOTICE TO INSTITUTIONS AND LOCAL EDUCATIONAL BOARDS.

The attention of Secretaries of Institutions and Local Boards is specially called to Par. 5 of the Programme of Examinations for 1861, as follows:

5. A detailed list of the chairman, secretary, and other members of each Local Board, giving not only their names but their addresses and designations, should be submitted to the Council of the Society of Arts before the 1st of January, 1861. In some cases the Local Educational Boards comprise such large districts that for the convenience of the Candidates, Branch Local Boards have to be formed within the Districts. Wherever this is the case, the names and addresses of the members, both of the District Board and of its Branch Boards, must be forwarded to the Secretary of the Society of Arts. All changes in the composition of the various Boards now in existence, or to be formed hereafter, should be immediately notified to the Society of Arts.

### FIFTH ORDINARY MEETING.

WEDNESDAY, DECEMBER 19, 1860.

The Fifth Ordinary Meeting of the One Hundred-and-Seventh Session was held on Wednesday, the 19th inst., John Dillon, Esq., Vice-President, in the chair.

The following gentlemen were proposed for election as Members of the Society:—

Bertram, George,.....	Sciences-street, Edinburgh
Bucknall, William Miles .....	Board of Trade, Whitehall, S.W.
Budgett, John P. ....	{ Henleaze-park, Westbury-on-Trym.
Chambers, Charles .....	Broomfield-park, Sheffield.
Goldschmidt, Otto .....	{ Argyle Lodge, Wimbledon-common, S.W.
Hands, Medwin .....	4, White-street, Coventry.
King, John Hufham ...	66, Hatton-garden, E.C.
Knott, William .....	{ Bentcliffe, Saddleworth, near Manchester.
Leahy, Francis .....	Shanakiel House, Cork.
Lorsont, Jean Baptiste Athanase .....	{ 56, Cannon-street west, E.C.
Moody, William .....	{ 6, King's Bench-walk, Temple, E.C.
Pakington, J. Slaney ...	Kent's-green, Worcester.
Richardson, Samuel .....	Doncaster-street, Sheffield.
Robinson, George .....	Water-street, Dock-yard, Cork.
Thompson, M. W. ....	Park-gate, Guiseley, Leeds.
Veitch, James, jun. ...	{ Exotic Nursery, King's-road, Chelsea, S.W.
Wood, George.....	Bradford.

The following candidates were balloted for and duly elected Members of the Society:—

Andrew, W. P. ....	26, Montagu-square, W.
Harrison, Archibald Stewart .....	{ 133, Upper Thames-street, E.C.
Heath, T. Vernon .....	43, Piccadilly, W.
Moate, C. R. ....	65, Old Broad-street, E.C.

The Paper read was—

### ON THE STRAW PLAIT TRADE.

By A. J. TANSLEY.

Bedfordshire has long been celebrated for the production of beautiful wheat straws, suitable for the purposes of plaiting. The first straws used for the making of plait in this country were grown in the neighbourhood of Luton. Straw-growing now extends throughout the southern part of the country, in the valleys and along the slopes of the Chiltern hills, and also in parts of Hertfordshire, Buckinghamshire, Oxfordshire, and Berkshire. The best soils are light but rich; the stiff clays, being unsuitable, will not produce good straws. Some soils that would produce good straws but not yield a fair crop of wheat, are only cultivated for the latter, but those yielding both prove very advantageous to the farmer. The seed used is either that known as red lamas or white chittim wheat, according to soil and aspect, and is sown broadcast or drilled according to circumstances, and cultivation is carried on in the usual manner. When harvest draws nigh great care is required by the grower, it being necessary to commence cutting before the flag of the straw falls. If very wet and stormy weather sets in, the straws become rusted or spotted; or, if opposite weather, dry and hot, and the crop remains uncut, the straws change to red and become harsh. The first favourable opportunity is taken, extra hands are set on, the crop is rapidly cut, laid out to dry before being tied into sheaves, carted and stacked with all despatch as soon as ready. The result of this attention is in general seen in obtaining bright and clear straws that will repay the farmer for all his trouble. An acre of wheat will yield in a good season five to eight loads of wheat, of five bushels to the load, and from fifteen cwt. to a ton of cut straws, of the value of six to eight pounds sterling the ton, clear of all expenses. At the present time the price is double, for owing to the past wet and stormy summer, good straws are very scarce, many of the best growers, with all their care, having lost their crops.

The farmer disposes of his straw to men known as straw factors; these draw and cut the straws in his barn. Each sheaf is taken between the knees, and the straws are drawn out a handful at a time; the ears are then cut off and carefully laid together on one side. After a sufficient number have been drawn and cut, large bundles are formed, weighing 20 to 25 lbs., and these are carted to the home of the factor, to undergo another "cutting" process, which is generally performed by boys, who earn from 2s. to 5s. per week. In the act of cutting each straw the sheath in which it is encased is taken off. Two joints of the straw are preserved for plaiting, the other, or root joint, being cast away.

Straws thus cut are next subjected to the fumes of sulphur in a close chest, "steamed" as it is termed, and afterwards sorted by hand into proper sizes. Of late years sorting is performed by a hand-machine similar to a sieve; the straws, being held in an upright position, fall through holes of a uniform size. A final sorting takes place, when discoloured or spotted straws are thrown out, which, however, are not altogether wasted, as they answer for dyeing in some cases. Marketable bunches are formed of the various sizes and qualities, the bundles so made up fetching one halfpenny to one shilling per bunch; they are afterwards sold to the plaiters at the various markets of the districts, or in the immediate neighbourhood, the factors always residing within the plaiting districts.

There are straw-growing districts in Essex, but as the soil is unfavourable for the growth of good straws, great quantities are sent there to be made into plait from Bedfordshire and the other districts.

The growth and preparation of straws are most important branches of the "straw trade," and to the attention given to them during the last fifty years, much of the excellence of English-made plait is to be attributed. The districts were originally limited, but the advantages of straw-

growing have led to the present large extension of the districts in the counties enumerated, the possibility of obtaining a good crop of wheat, with a good crop of straws, having led on many a farmer to their successful cultivation.

#### STRAW PLAITING.

The art of making plaits from wheat straw was first introduced into England about two and a half centuries ago. In Agnes Strickland's "Lives of the Queens of Scotland," we read that Mary Queen of Scots, when travelling in Lorraine, in France, noticed that women and children were employed in the plaiting and making of straw hats, and in the districts where this light and pleasant handi-craft was practised, the peasantry were much better off than in other parts where it was not. It is said that the thought struck her that the introduction of this useful art into Scotland would be attended with much benefit to her own subjects. She therefore prevailed upon some plaiters to return with her to Scotland; this was about the year 1562. The troubles in which she was afterwards involved prevented her fully accomplishing her object; but her son, James I., took a lively interest in his mother's plaiters, and transplanted them to Luton, in Bedfordshire. While, however, they remained in Scotland, they taught their art, and plaiting still survives to the present day in the Orkney Islands, though the quantity now made there

very limited.

These plaiters are supposed to have arrived in England about the year 1603, and must have taught the peasantry the art of making whole-straw plait. About a century after this, it is stated in "Oldmixon's History of England," that plaiting had, in 1724, greatly extended, and that several thousand plaiters found profitable employment both in Bedfordshire and Hertfordshire. In the reign of Queen Anne, large quantities of hats were made from the whole-straw plait, a taste for hats having sprung up at Court, as shown in the costumes of that reign in the milkmaid hat, and later, in the succeeding reigns of the Georges, in the gipsy hat. The heaviness of the article, however, led to efforts for improvement, in order to produce a lighter description. At first the contrivances for the splitting of straws were of a clumsy character. Some plaiters, indeed, cut the whole straw with a knife, and made a kind of split plait, which realised as much as a shilling per yard, or 2*s*. per score (at the present time it would be about 4*d*. per score). A considerable quantity of fancy work was made about this period at Dunstable by straws, so cut, being made into what was called "laid-work." It consisted of the split straws being flattened, and afterwards pasted on wood or other firm substances; various pretty and useful articles in the shape of baskets, work-boxes, mats, &c., were thus made. Dyed straws were introduced, forming variegated patterns, and many other ingenious devices, and these were sold to the passengers passing through that ancient thoroughfare in the days of coaching. Many hats were made at the same period, and together with the fancy work, brought Dunstable into notoriety in connection with the straw trade; hence the names of Dunstable plait, Dunstable hat, Dunstable bonnet.

The efforts at splitting straws made at Dunstable in the "laid-work," and around Luton, were not successful in discovering a proper instrument. Who it was that at last succeeded in the invention of that most important and useful little "machine," as it was named, the straw splitter, cannot now be traced, but it is generally supposed that the French prisoners at Yoxley Barracks, near Stilton, first made it in bone, between the years 1803 and 1806. It was about two inches long, brought to a point, behind which a set of cutters was arranged in a circle; the point entered the straw pipe, the cutters separating it into so many equal-sized splints. Some were arranged to cut a straw into four parts, others five, and so on up to nine. This instrument was soon imitated, and being of such surprising utility, numbers were speedily made, and fetched as much as from one to two guineas each. A blacksmith at Dunstable, named Janes, made them in iron, and turned

the end downwards at right angles with the stem, the cutters being placed immediately above the point. This soon after became the general form in which it was made, with the same varieties of cutters as at first in bone. A few years afterwards, about 1815, others were made like wheels, and inserted in a frame, the points projecting in front of each; by this arrangement four or five splitters could be fixed in one frame. As these instruments became common, and were made in brass, the price being about sixpence each, the making of split plaits with facility was placed within easy reach of the plaiters. To this invention may be attributed the success which, in after times, has attended the manufacture of straw plait in England.

The first split plait was made of seven straws, and it fetched as much as 12*s*. per score. Many amusing accounts have been handed down of persons called "dealers," collecting it of the plaiters five yards at a time, meeting them on their way to market as early as three or four o'clock in the morning, and making great efforts to obtain it. Prices continued high for many years. Other kinds were also invented, called rustic pearl, Italian (made of eleven straws) diamond plait, and other fancy kinds. Much plait was also made by the French prisoners at Stilton, about the year 1810. The plait they made was purchased by persons from Luton, who, at much risk, succeeded in holding communication with them.

Bonnets made of split straw succeeded rapidly in displacing the whole-straw Dunstable hat, and continued a favourite article of fashionable wear for a long time, but Leghorn hats eventually interfered with them. Chips also had a considerable sale. About the year 1820, Leghorns were largely imported into England from Italy, by Mr. Thomas Vyse, of London, and their sale was very great for many years, the prices varying from two to four guineas each.

The great demand for Leghorns led to many attempts being made to produce an article resembling them in England. Correspondence was carried on by the Society of Arts with certain persons who were attempting to accomplish the object, and every encouragement was offered by the Society to parties trying to grow straws like those in Italy, and then making a similar article to the Leghorn hat, in order to increase the home manufacture. A Mr. Parry received the Society's large silver medal in 1822, for his method of manufacturing Leghorn plait from straw imported from Italy. No person succeeded so well, however, as the late Mr. Thomas Waller, of Luton, in his efforts to find employment for the population of his native town. This gentleman at first imported seeds of the Italian wheat, and endeavoured to raise straws from it in the neighbourhood of Luton, but though not in the end successful, being beaten by the uncertainty of our climate, and the want of sufficient heat in our atmosphere, he hit upon the expedient of using straws which he imported from Italy, in making eleven straw plaits in the English style. The plaiting of eleven Tuscan straws, with the straws set out evenly at the lower edge, and not in the middle as Leghorn plait, was the new feature of his peculiar manufacture; the plait so made was a great success, and through his invention he obtained a patent for a bonnet, called by him the "Tuscan Grass Bonnet," which was afterwards patronised by Queen Adelaide, and great numbers were sold all over the kingdom at prices from 30*s*. to 50*s*.

Large importations of Italian straws were made by him, and many thousand persons in a few years were employed on the new plait. Eventually, the same kind of plait from Italy much interfered with the home-made; but notwithstanding this, English-made Tuscan employed many thousand of plaiters, both in Bedfordshire and Hertfordshire, for many following years.

From the time of making the first single plait, called split, at the commencement of the present century, many fancy kinds of plait were invented in the split straw; the plait called "corkscrew" was one, and a bonnet made from it was worn by Lady Bridgewater. Similar fancy

plaits and trimmings followed. About 1820, a new kind of plait, more durable, and with a surface more glossy, was invented, and it may be said to have been the parent of most of the numerous kinds that afterwards came up. This new sort was formed of seven double straws, two splints with their pithy or inner sides being laid together after having been flattened, and thus a "double" straw was made, forming a smaller and lighter thing than the whole pipe, however fine. Seven of these doubled straws, being plaited, formed the new plait termed "Patent Dunstable." This invention was followed by another and broader, and termed "improved." Another, formed of eleven doubled straws, from a fine splitter, was named "Bedford Leghorn," and one with 15 doubled straws was named "Rutland." All these plaits realised very high prices when they first came up. These four kinds were soon after made into rice-straw plait. This novel kind differed in this important particular, that the straw was reversed, the inner or pithy side being worked outwards, and the natural or bright side worked inwards. This kind, in after years, had an immense sale, and some of the finest, which resembles chip to a great degree, was made up for wedding bonnets. About this time, 1820 to 1830, much broad single plait was made, called "Italian," "Devon," and broad pearl or rustic, from which the cheapest straw bonnets of the day were formed. The making of these varieties found employment for great numbers of plaiters, and being more profitable than lace-making, many of the children of lace-makers were taught this more valuable art.

Between the years 1844 and 1850, other and more important plaits were invented. An idea occurred to a straw-plaiter of turning the straw on the upper edge in such a manner as to form a bead or pearl, and by working each pearl along the edge at every other straw, the plainness of the edge was broken, and a new plait was formed, of a pleasing appearance. This plait was found, when made into bonnets, to give quite a new feature to them, and led to the general making of this plait wherever plaiters had sufficient skill. The pearls were afterwards doubled, two being formed one next the other. A third, with three pearls, was soon after invented, and these plaits were respectively named one-pearl, or China pearl, two-pearl, and three-pearl; the last named, three-pearl, or rock edge, having proved most useful; it was afterwards called Cobourg. These same descriptions were subsequently made in eleven straws. Some had the straw worked over a wire, and were named moss-edge plaits. One most useful sort was worked every straw over a wire, and was named satin piping, or Vienna. Others had their edges worked so as to imitate a feather, and hence were named feather-edged. Another sort was made of eleven straws, open in the middle, like lattice work, and was named Brussels. Another, similar in some respects to the last, was called birds-eye. Much plait in seven and eight straws had been made, composed of coloured and white straws mixed together, and made in a variety of patterns. These plaits being cheap, and bonnets made from them of economical wear, great quantities of plait were used, and employed numbers of children in the plaiting districts. But the most important of double plaits is that termed twist edge, and made within the past fourteen years. This plait was also named whipcord edge, from the fact of the straw being whipped over as it were. It is also made in whole-pipe seven and eleven straws, and is a staple article of English wear, forming the true straw bonnet, by exhibiting English straw to the best advantage. The discovery of this valuable plait has been attended with happy results, as it is a description capable of being used in almost every kind of hat or bonnet.

These various descriptions of straw plaits have enabled the trade to produce so many novelties that Tuscan plaits for bonnets declined as articles of wear, the beauty of English straw plaits, as displayed by these new patterns, leading the public to give them the preference; and although the lowering and afterwards abolition of the duties on foreign Tuscan brought that article into competition with the

English straw manufacture, no injury has been sustained by the straw trade. Tuscan is chiefly confined to girls' hats at the present time, and its low price since the removal of the duty has completely abolished the making of Tuscan plait in England from Italian straws.

The plaits now enumerated of English make from the wheat straw were those shown at the Great Exhibition in 1851. At that concentration of the best productions of the plaiting districts, the skill of the English plaiter was fully shown. From that date plaiting has continued to progress, not so much in the invention of a number of new plaits, as in the superior quality and extent of the manufacture. The newest feature is the production of various coloured plaits of excellent patterns, suitable for ladies' hats, the last and popular colour being produced in mixed and dyed plaits, as mauve, magenta, &c. Many valuable patterns have been made by mixing rice straw with dyed straw, as rice and black, rice and mauve, rice, black, and brown, and similar patterns.

The progress made in English plaiting up to the present time (1860), has been thus remarkable in the varieties produced to meet the public taste and the necessities of the million. And although foreign straw plaits from Belgium, Germany, and Switzerland, have been brought to compete with them, they have nearly all failed in this respect. A few single plaits of a choice character are used for white goods, but the greater portion, from the inferiority of their colour, are only suitable for use when dyed.

Straw plait is a domestic manufacture, carried on in the cottages of the agricultural labourers of the three counties of Bedfordshire, Hertfordshire, and Buckinghamshire, and portions of Essex and Suffolk. The plaiters are generally the wives and children of the labourers; a few are men. No plait is made in factories.

Children are taught usually in schools, and are sent at the early age of four years; besides plaiting, they are taught the simple elements of spelling and reading. In most villages there is a plaiting school, which is generally conducted by an elderly dame, who receives from each scholar 2d. or 3d. per week. The children are some time before they can plait so as to earn anything, but after a year or two they contrive to obtain 6d. to 1s. 6d. per week, after their plait is disposed of by their parents. They remain at school the usual school hours; afterwards, during the time they do not play, they plait a little till sent to rest. They continue working at school till they can plait sufficiently well, and when they are above eight or nine years they earn 2s. to 3s. per week. On leaving school, they earn 4s. to 5s. if expert plaiters, and after they become skilful they may obtain as much as 7s. Many learn to sew if near Luton or Dunstable, and then leave their cottage-home for the greater attraction of hat and bonnet sewing, a sewer being considered a step above a plaiter; and one who may exhibit an amount of personal adornment, to which a simple plaiter would not dare to aspire in her village-home.

These young persons, when first at school, are not much looked after as regards the proper attainment of the very rudiments of knowledge, except in those cases where the schools are under careful visitation by the minister of the parish, or by persons in the neighbourhood. The difference between visited and unvisited schools is of a marked character; the comfort, health, and education of the children, as well as their plaiting, being attended to; and, as a consequence, they are more healthy, and their minds more active and vigorous than at those schools which are unvisited and uncared for. It may be safely affirmed of the greater number of these schools, that the children taught within them are altogether lost sight of by the wealthy and other classes around them.

Plait is made all the year round, except during the interruption of harvest time. The plaiters do but little then, especially when the time of gleaning arrives. In winter plait is made indoors, and as the splints have to be worked in a partially wet condition, it is cold work for the fingers.

When plaiting near the fire the straws are liable to injury; winter-made plait is never so good as when it is done in spring and summer, away from the fire or in the open air, at the cottage door, or along the green lane.

The earnings of plaiters vary much according to the time devoted to it. Unmarried women, who are skilful and quick, earn the most, but some married women contrive to do pretty well; and a well-ordered family will obtain as much or more than the husband who is at work on the neighbouring farm; in this respect plaiting far exceeds lace-making. The earnings of a good plaiter, after the straws are deducted, will be from 5s. to 7s. 6d. per week, in a good state of trade.

The plaiting districts are now wide spread; each district has a plait market as its centre. The chief markets are Luton, Dunstable, Hemel Hempstead, and Hitchin. There are nine lesser markets, and they all begin at a fixed hour in the morning, a bell being rung to announce the commencement. The districts do not all produce the same descriptions, plain plaits being the product of one locality or district, fancy of another.

It is computed that the number of females engaged in plaiting, and boys up to eight years of age, would now be near to 50,000, and the number of yards annually made 200,000,000, or 10,000,000 scores of plait of every description.

Plait is sold by the score of 20 yards, at from 2d. to 3s. per score, and is done up in double links of 17 inches in length,\* 20 such forming the score. One week's work is generally disposed of at a time by the plaiters, either at market, or to dealers living near to them. In some cases several weeks' work is kept before being disposed of.

The measure of plait till recently was very deficient, being frequently but 17 or 18 yards, or even less to the score. Of late years an association for the suppression of this evil has been established, which has been attended with most beneficial results, the measure being now very near the just standard.

The number of towns, villages, and hamlets embraced by the districts, is computed to be between 190 and 200. Of the towns, there are Luton, Dunstable, St. Albans, Hemel Hempstead, Chesham, Tring, Leighton Buzzard, Ivinghoe, Toddington, Ampthill, Shefford, Baldock, and Hitchin. At each of these towns there is a plait market, to which the plaiters come from distances varying from one to six miles. The plait is sold in the open market, beginning at 8 o'clock in the summer and 9 o'clock in the winter. At these markets straw dealers attend, and from them the plaiters obtain their straws when they do not purchase them nearer home.

#### THE STRAW PLAITS TRADE.

Plait, after being collected by the dealers (of whom there are from 150 to 200), is brought for sale to two markets, Luton and Dunstable, but chiefly to the former town. Luton market is held on each Monday throughout the year, and as such large quantities of plait are disposed of, it is attended by almost all the trade; from 150,000 to 200,000 score are sold in busy times on a single market day. Marketing extends in general over three hours.

Plait, after being purchased of the dealers, is either bleached or dyed. Till within the last eight years it was chiefly bleached, but owing to the immense sale of black, brown, and other self-colour hats, the quantity that is dyed is at some parts of the year greater than that bleached. The dyeing of plait is now a most important branch of the trade, and to the first dyer of plait the trade is greatly indebted. This person was a Mr. Thomas Randall, of Sundon, near Luton. Pipe straws were dyed by him, and by Mr. Wright, of Hemel Hempstead, many years before plait was dyed a self-colour, but the honour of the application of dyeing to plait belongs wholly to Randall. Had he secured it by patent he would have retained it for a long time in his own hands, but as he did not, plait dyeing in a

few years was practised by other persons, who now employ many men and boys, who otherwise could hardly have found employment in the trade in other occupations.

Plait dyed or bleached is chiefly sewn into hats or bonnets at Luton or Dunstable, or is exported; the greater portion is, however, required for home consumption. Very little was formerly sewn up at Luton or Dunstable. Up to the year 1835, the Luton trade consisted in plait more than in bonnets, which plait was sold all over the United Kingdom for bonnet making. But the cheapness of Luton bonnets, and their superiority over others made by the bonnet milliners, gave rise to the present trade. The first manufacturer who gave a start to the Luton bonnet trade was the late much-respected Mr. Edward Waller, who, by his enterprise, laid its foundation. His brother, Mr. Thomas Waller, helped much in this direction by the excellency of his productions in Tuscan bonnets. About the same period, 1830 to 1840, branch establishments were opened in Luton by London firms, as Vyse and Sons, Gregory and Cubitt, Welch and Sons, Munt and Brown, the first-named firm especially helping to bring Luton manufacture into reputation. A good deal was being done at Dunstable in bonnet and hat making about the same time. At the early period of bonnet making in Luton, other materials were used in their construction besides straw, as chip and sewn willows, the latter having been first woven in a loom, afterwards dyed black, and then the cut strips were sewn into bonnets and carefully pressed; hence the cheap willow bonnet. The making of Tuscan bonnets was a very important branch also.

Further improvements in shape, superiority of colour and finish, continuing throughout a series of years, brought the Luton trade to its present perfection, and have been the causes of the present extensive English and foreign business. Luton was described by Boswell, in 1781, after his visit to Lord Bute's, at Luton Hoo, as a "village," by after writers as "a small dirty town in Bedfordshire." In 1801, the census showed 3,095 inhabitants; in 1841, 7,740. In 1851, it had risen to 12,783; at the present time it is well drained and paved, and is supposed to contain about 18,000, and will in another year or two amount to 20,000, if its trade still keeps enlarging. As would be supposed, the females out-number the males, but not quite to the extent some imagine.

The sewers of Luton are divided into two classes, those employed in the rooms of the manufacturers, or who are employed directly by them out of doors working at home, all of whom are under direct control; and those who are employed on "sale work" on their own account, and who are their own masters. More are employed on "sale work" than in rooms. There are many persons of respectability who employ 10 to 20 or 30 sewers, and dispose of their goods likewise to the warehouses. Of the whole population, 12,000 are supposed to be occupied directly in the trade, the remainder being chiefly dependent upon it indirectly.

Of the class of sewers employed by the manufacturers the most skilful are the room hands. Their earnings are excellent, and superior to any similar class in the kingdom; some two thousand or more are engaged in the room work, and their hours commence at 9 o'clock in the morning, and in general terminate at the same hour in the evening; they are all employed upon piece work, and have to sew up the plait or other material to a given shape and size of hat or bonnet. They are not strictly confined to the rooms when at work, as in the cotton factories of the north. The rooms are in general provided with every comfort and convenience for carrying on their work and for preserving health, some masters taking especial care in this respect. As a body, they may be considered virtuous and industrious, betokened by their neat attire and good behaviour. Their earnings in the season vary from 8s. to 12s. for the medium hands; 12s. to 15s. is obtained by those employed upon the best plain goods; and best fancy hands can obtain from 16s. to 20s. per week; these earnings are subject to variation with the fluctuations of the trade.

\* An additional inch at each end is taken up in the bend, making 36 inches in all.

Many of this class return home in July and August for a holiday, coming to work again in September. Numbers come from considerable distances, as far as 30 to 60 miles. It is not a matter of surprise that out of so large a body there should be found many that are unsteady, being out of reach of parental control; they are, however, exceptions. Numbers are teachers in the various Sunday-schools, and many of the younger ones are scholars. Some attend week evening services at Church or Chapel, and on other evenings the "Young Women's Institute," where there are a library and periodicals for their use; in the season there are concerts of an excellent character once a fortnight, under the management of the Luton Harmonic Society, the admission to which is but trifling, in order to place its advantages within their reach. There are also saving societies and sick clubs, to which numbers belong.

The other and larger class of sewers are those engaged upon "sale work," and as this is the commonest description, their earnings are in proportion. The goods are in general sold by them to the warehouses at the end of the week. Almost every poor family is employed upon this kind of work, and their earnings vary very considerably; but, on the whole, more is obtained than by the plaiting families of the surrounding districts. As this class of the population is very numerous, they are subject more suddenly to the changes of trade, their productions frequently being in excess of the demand. In good seasons their earnings are excellent, but during the past twelve months they have suffered greatly from the depression of trade caused by the wetness of the season. As a body, they are not remarkable for providing against the reverses of trade, any more than similar classes elsewhere. Many young persons come into Luton to work for them in order to learn the art of sewing; and from these and others who are not under sufficient control, those instances of thoughtlessness arise which startle strangers visiting the town. The immorality of many of the females thus employed upon the staple of the town may in part be attributed to its non-factory character; so many working for themselves, and not being in the employment of the manufacturers, the latter cannot be considered accountable for the vanity and frivolity displayed by them. But while there are these instances of youthful folly, the industry of the mass of the population is great, as may be seen when it is considered that the "sale work" amounts to nearly five millions of bonnets and hats within a twelvemonth. So vast has the trade become, and so industrious are the fingers that ply the needle, that articles of cheapness and utility are the result of their industrial occupation, such as no other town, unaided by machinery, in the kingdom can exhibit.

The earnings of those employed upon sale work vary much. Children earn 2s. to 3s. per week; girls and women 5s. to 8s. per week. Boys in some cases also sew, and some men in the winter season, when other employment is scarce.

The male part of the population engaged in the trade are boys and lads, employed in bleaching, dyeing, and brushing plait, earning 5s. to 8s. per week; men at the same earning 12s. to 15s., and the large and important class of blockers or pressers earning 20s. to 30s. per week.

The Luton productions of the superior descriptions are manufactured in the work-rooms, and amount to from two to three millions of bonnets and hats annually.

Of late years much valuable material has been worked up at Luton, either alone or with English straw. These materials consist of foreign and St. Albans-wove trimmings, and that most important article from Switzerland, hair braids or embroidered hair braids and trimmings, commonly known as crinoline. Similar hats and bonnets are made up at Dunstable; and the two towns, now connected with each other by railway, and at so short a distance, may be considered as one in the superiority of their manufactures; though "sale work" is produced at Dunstable, in a very small degree.

The "straw trade," in all its numerous ramifications, is most extensive, and when the bonnets and hats now made

in London from Bedfordshire and other straw plait are added, the annual returns will not fall short of one and a quarter millions sterling.

During the past 15 years a large shipping trade has been carried on, chiefly, in the first instance, with the United States of America; later, in addition to this, large quantities of English straw goods have been shipped to Canada, Australia, the West India Islands, India, the Brazils, and to the Continent; and while France supplies England with her newest fashions in bonnets, she in return is supplied with the latest fashions in hats from England.

Before closing the subject, it is necessary to notice the novel but useful invention of mixing white cotton braids, now made chiefly at Manchester, with straw plait. In the first instance the white braid was made up alone, as is still done for some descriptions of bonnets. The introduction of this new material is referred to the Messrs. Woolley, Sanders, and Co., of London and Dunstable. The bonnets made of the braid are whiter by far than those of chip, and are often preferred for wedding bonnets. The finest braids are named chip braids.

From the foregoing statements the trade of Luton, and the straw trade generally in England, is exhibited as assuming greater importance every year. Luton is now in direct communication with the metropolis by means of the Great Northern line, the Luton branch railway joining the main line near Hatfield. This important advantage is likely to develop still more the straw trade of Bedfordshire, by placing the emporium of it, Luton, within easy reach of all travellers. It is in communication with the North by means of the railway to Dunstable and Leighton. In addition to the straw trade of Bedfordshire, there is the Brazilian hat trade of St. Albans, which employs about 1,800 persons in the town and neighbourhood, and in other branches of hat-making, forming the staple trade of that town.

The population of Luton is fairly supplied with day schools; and with Sunday schools added, it may be said the young are far from being neglected. In the day schools at the present time there are 1,169 scholars, and 510 attending night schools. In the Sunday schools there are 3,015 scholars and 313 Sunday school teachers. There are eight places of worship of all denominations, which are in general well filled on the Sunday, capable of accommodating 8,000 persons.

#### DISCUSSION.

The SECRETARY stated that the Society, at a very early period of its existence took a considerable interest in the straw plait trade. In 1805\* the Gold Medal was voted to Mr. Wm. Corston, of Ludgate-hill, for his invention of a substitute for Leghorn plait for hats. In his communication to the Society he states that large sums are remitted to Italy, Germany, &c., for the purchase of Leghorn plait, and that the annual importation of this material for the preceding ten years would furnish employment for 5,000 female children and young women, and give cultivation to 2,000 acres annually of poor land for raising straw, unfit for other culture. He claims to have produced specimens of a manufacture never before made in this country. The straw used by him was rye straw, and the specimens sent to the Society were made in a school he had at Fincham, in Norfolk. Mr. Corston subsequently, in 1810†, described the progress he had made in carrying out his manufacture, and points to the importance of thus turning any waste land (Bagshot-heath, for example) to account. The large Silver Medal‡ in 1822 was voted to Mr. John Parry, of Little Mitchell-street, Bartholomew-square, for the manufacture of Leghorn plait from straw imported from Italy. At that time there was a duty of £3 a dozen on the importation of hats, and a lighter duty of 17s. a lb. on plait not made up, and a duty of 5 per

\* Transactions of the Society of Arts, Vol. xxiii., page 223.

† Trans., Vol. xxviii. p. 130.

‡ Trans., Vol. xl., page 222.

cent. *ad valorem* on straw not plaited. Mr. Parry, it appears, made himself acquainted with the art of plaiting in Italy, and describes the method of doing it, and also the mode of "knitting" or joining the plaits.

In the same year,\* this Society gave its Silver Medal and twenty guineas to Miss Sophia Woodhouse (afterwards Mrs. Wells) of Weathersfield, in Connecticut, for a new material for straw plait. The material she used was the stem of a species of grass growing spontaneously in that part of the United States, popularly known by the name of " ticklemoth."

The hats sent over were pronounced, by those engaged in the trade, to be superior to Leghorn for fineness of material and beauty of colour. The medal was granted on condition of Miss Woodhouse sending over seeds of the grass. The seeds were sent over, and were distributed by the Society for cultivation.

In 1823,† the large Silver Medal was awarded to William Cobbett, of Kensington, "for the application of native English grasses as the material of fine plait." He states that he obtained seed of the grass used by Miss Woodhouse, which he alleged to be the *Poa pratensis*. He found this grass could be grown in England. He, however, used various native straws and grasses—viz., wheat, *Melica caerulea*, *Agrostis stolonifera* (a sort of couch grass), *Lolium perenne* (rye grass), *Avena flavescens* (yellow oat grass), *Cynosurus cristatus* (crested dog's tail), *Anthoxanthum odoratum* (sweet-scented vernal grass), *Agrostis canina* (brown bent grass).

The bleaching was the difficulty he had to overcome, and in this he states he had fully succeeded. In the Society's Transactions will be found a detailed account of the methods he adopted.‡

In 1824, the Transactions (Vol. xlii., p. 74) record that rewards were given as follows:—

The premium of fifteen guineas was given to Lucy Hollowell of Nethrop, near Banbury, for two bonnets manufactured by her of the crested dogs'-tail grass, (*Cynosurus cristatus*). The grass was prepared and bleached according to the instructions printed by Mr. Cobbett. Up to February, 1824, it appears, from the accompanying certificate, that she had made thirty-five ladies' bonnets and two gentlemen's hats.

The premium of fifteen guineas was given to Mrs. Morrice, of Great Brickhill, Bucks, for a bonnet made by her of crested dogs'-tail grass.

The premium of fifteen guineas was given to Priscilla Surrey, of Harpingden, Herts, for a bonnet made by her of meadow fox-tail grass (*Alopecurus pratensis*).

The sum of ten guineas was given to Betty Webber, of Clatworthy, Devon, for a bonnet made by her of crested dogs'-tail grass.

The sum of ten guineas was given to Mrs. E. Mills, of Bath, for a bonnet manufactured by her, as well as for instructing several poor persons in the same art.

The Silver Ceres medal was given to Mary Marshall, mistress of Lady Bernard's school at Bandon, near Cork, for a bonnet made by her of crested dogs'-tail grass.

The sum of five guineas was given to the children of the school at Bandon, mentioned in the preceding article, for their proficiency in plaiting under the instruction of Mary Marshall.

The Silver Ceres Medal was given to Messrs. James and A. Muir, of Greenock, for a hat face and thirty score of plat of different qualities. From the letter accompanying their specimen, it appears that they were endeavouring to establish, on a large scale, a manufacture of hats plaited and knit in the same manner as those imported from Leghorn. The material which, in their opinion, answered the best (and of which the specimens sent were formed), was rye straw dwarfed by being grown on poor land. The

plaiting was performed by women and children in the Orkneys.

The Silver Ceres Medal was given to Mrs. Mears, of Durley, Hants, for a bonnet of crested dogs'-tail grass plaited under her direction and knit by herself.

The Silver Ceres Medal was given to Mrs. Venn, of Hadleigh, Suffolk, for a bonnet made of crested dogs'-tail grass.

The Silver Ceres Medal was given to Miss Mary E. Collins, of Dublin, for a small hat made by her of yellow oat-grass, (*Avena flavescens*).

The Silver Ceres Medal was given to Mrs. Pyman, of Coombs, Stowmarket, for a bonnet made under her superintendence, of crested dogs'-tail grass.

The Silver Ceres Medal was given to Messrs. Cobbing and Co. of Bury St. Edmunds, for two bonnets, a fine one made of crested of dogs'-tail grass, and a coarser one made of underling wheat.

The sum of five guineas was given to Mrs. E. Bloomfield, of Bury St. Edmunds, for a hat made of crested dogs'-tail grass.

The sum of five guineas was given to Mrs. M'Michael, of Penrith, Cumberland, for a bonnet of grass in part procured from Mr. Cobbett, and in part prepared by herself.

The sum of two guineas was given to Jane Hurst, of Leckhamptstead, Bucks, for a bonnet made of bent grass.

The sum of two guineas was given to the children of the national school at Nunney, near Frome, for a bonnet made of cat's-tail grass, (*Phleum pratense*).

All the specimens mentioned above are stated so far to resemble Leghorn bonnets that they are made not of split but of entire straw; and the pattern of the plait, and mode of knitting the edges of the plat together, are the same.

In 1825\* the Society gave the following rewards for Bonnets and Hats, made of British material, plaited and knit in imitation of those imported from Leghorn.

#### FOR ARTICLES MADE OF INDIGENOUS GRASS, CHIEFLY THE CRESTED DOGS'-TAIL.

To Sophia Dyer, of West Meon, near Alton, Hants; two guineas.

To Anne Dyer, ditto; two guineas.

To Mrs. Venn, of Hadleigh, Suffolk; nine guineas.

To Anne Venn, ditto; three guineas.

To Lucy Hollowell, of Banbury; five guineas.

To the children of Mrs. Villebois' school at Adbury, Berks; five guineas.

To Mary Marshall, mistress of Lady H. Bernard's school, at Bandon, near Cork; two guineas.

To the children of the school at Bandon; three guineas.

#### FOR ARTICLES MADE OF SPRING WHEAT.

To Mr. James Cobbing, of Bury St. Edmunds; fourteen guineas.

To Maria Pain, of Boxted, near Bury St. Edmunds; two guineas.

To Mrs. Morrice, of Great Brickhill, Berks; the Silver Ceres medal.

To Mr. James Long, master of the house of industry, at Barham, Suffolk; the Silver Ceres medal.

To Mrs. Syrett, of Bury St. Edmunds; ten pounds.

The transactions state that the specimens produced "are mostly superior to those for which rewards were bestowed in the year before: they exhibit considerable dexterity and accuracy, both in the plaiting and knitting, and some of those which are made of the straw of spring wheat may be mistaken, by ordinary observers, for real Leghorn of average quality. The crested dog's tail, the best probably for this purpose of our indigenous grasses, through of good colour, appears to be deficient in strength and elasticity; but the spring wheat (which is, indeed, the very plant used in Tuscany) appears, under proper

\* Trans., Vol. xl., p. 217. † Trans., Vol. xli., p. 98. ‡ Trans., Vol. xli., p. 98.

\* Trans., Vol. xliii., p. 80.

management, and in a suitable soil, to produce straw every way fit for the purpose."

In the same year the Society gave its Silver Ceres Medal to Mrs. Lowrey, of Exeter, for a bonnet made of doubled wheat straw.\*

Mr. P. L. SIMMONDS said, the Society and the public generally were greatly indebted to Mr. Tansley for having prepared and laid before them with so much method and care an historical summary of the rise and progress of a very important home trade and manufacture, of which little was previously known—certainly nothing, calculated to convey any idea of the extent, the capital embarked, and value of the product. Although in the mere popular view of the subject it might—in its various details, and glancing at the numerous specimens exhibited—be considered more interesting to ladies, who were the principal purchasers and wearers of bonnets, yet it was not without general interest to the male sex, who sometimes wore straw-hats in boating, cricketing, &c., and were also interested in it as relating to home and export trade. It was much to be wished that a little more boldness was manifested by men, in wearing, at suitable seasons, a lighter covering for the head than the silk, felt, and cloth hats usually worn. Such a practice, while helping on an important home manufacture, would likewise, he thought, conduce to the preservation of the hair and lessen the number of bald heads. The due ventilation of the head and the more free exposure of the hair greatly conduced to its healthy preservation among the ladies. Our ever changing fashions and variable climate had much to do with the progress and prosperity of the straw plait manufacture. Looking at the strong contrasts in fashions, and the recurrence from time to time to old and obsolete styles of articles of dress, it was by no means improbable that the cottage bonnets, and milk-maid and gipsy hats worn half a century or more ago, which Mr. Tansley had pointed to as such curiosities, might, after all, be again seen in the shops and on ladies' heads. The subject of the working-up of grasses and plait of various kinds into coverings for the head, ornaments, matting, and fancy work, was not of interest alone to ourselves. The details and information connected therewith, hitherto of the most meagre character, were of great importance to numbers in Europe and America, as well as in Asia and our colonies. Some of their manufactures came occasionally into trade here, and several were of a most expensive character, realising exceedingly high prices. Such, for instance, as the fine Panama hats, so common an article of wear in Central America, the Southern States, and the West Indies. The sinnet hats, plaited by seamen, were made from the fronds of a species of palm; the cabbage-tree hats of Australia were from another palm, so were those made in Brazil, and the palmetto hats of the United States. In the Philippines hats were made of a very fine kind of rush, and formed of two hats, one within the other. At Ningpo, China, straw hats were made to a large extent, for he noticed that as many as 40,000 were sent annually to Shanghai from thence. Indeed, every country had its peculiar light hats in use, and most of them made of indigenous fibres. He would glance at the particulars of some few of these, which were of interest by way of comparison with our own growing trade and manufacture in straw plait. Florence long enjoyed a monopoly in straw work for hats and bonnets of great fineness and remarkable beauty, insomuch that bonnets had been made there that sold for as much as £70. The Swiss hats were made in Venetian Lombardy, and, if less fine than those of Florence, were at least cheaper. The straw plait industry was of great importance in Tuscany, occupying about 35,000 workpeople. The attempts made in other countries to produce the peculiar kind of straw used had hitherto entirely failed. The seed from which the straw for plaiting was grown was a small round grain of wheat, called *Grano marzolano*. It

was an error to suppose that hats were made from rye or any other grass in Tuscany. This marzolano straw was cultivated for the sole purpose of being made into hats, and was grown chiefly in the vicinity of Florence, and on the hills on both sides of the valley of the Arno. Tuscan women had settled themselves in various places, such as Vienna, St. Petersburg, &c., where they carried on the manufacture with straw grown in Tuscany. Fine plait was not accounted good unless very much drawn together, for which end it was worked very wet. After being soaked and pressed, the plait was made up into hats by women who did nothing else; it was put together by the edges, not overlapped. On the operation of pressing a great deal depended. From a late consular return, he found that in the period of five years, from 1851 to 1855 inclusive, the exportation of straw work from Tuscany had progressively increased, as follows:—

1851	...	...	...	...	£9,832,292
1852	...	...	...	...	12,628,490
1853	...	...	...	...	16,772,314
1854	...	...	...	...	13,213,756
1855	...	...	...	...	23,186,820
Total					75,633,672

The diminution observable in the returns for the year 1854 was not real. The crop of straw was most abundant in that year, and the quantity of straw-work manufactured, very considerable; but a great part was exported in the following year. The value of straw-work exported, classed under different heads, gave the following results:—

	Hats.	Plaits.	Straw.
	£	£	£
1851	5,204,093	3,804,600	138,471
1852	7,875,475	4,014,604	335,331
1853	10,811,865	5,183,352	199,898
1854	6,956,620	5,278,824	95,012
1855	15,834,507	7,158,060	30,553
Total	46,682,560	25,489,440	799,265

It was clearly proved by this table, that the greater part of the straw was manufactured into plaits in Tuscany, and the popular belief that the liberty to export straw would ruin the native industry was shown to be unfounded. The value of straw-work exported during the above period constituted 28½ per cent. of the whole exportation of Tuscany. In the Duchy of Baden, considerable attention was given to the manufacture of straw hats. Those, particularly, from the districts of Neustadt, Freiburg, and Schönau, feared no competition save that of Italy. The superiority of these districts of the Black Forest was due, first, to the excellent quality of the straw, and, secondly, to the numerous schools which the government had carefully established there for teaching this particular branch of trade. It was worthy of remark that, in the Wurtemberg part of the Black Forest adjoining these districts, the straw did not possess those qualities which distinguished that grown on its southern side. It was clearly, then, the climate which here favoured the Grand Duchy. This industry was a most popular one; and everywhere in the forest the women might be seen twisting, in their agile fingers, the plaits of straw destined to adorn the pretty heads of their fair countrywomen of the towns. In Switzerland again, upwards of 70,000 persons were employed on straw plaiting and hats. The canton of Fribourg exported goods to the value of £60,000 or £70,000, and that of Argovie more than half a million sterling. France had a large trade, principally for local use, in straw hats and bonnets, at wholesale prices, ranging from 4s. to 15s. per dozen. At the Paris Exhibition of 1855, where

there was an excellent display of straw plait manufactures of Tuscany, Switzerland, Belgium, Saxony, and France, Great Britain in this class was quite unrepresented, although, as the Jury Reports observed, "She occupies a distinguished rank" in this particular manufacture. A very creditable competitive display of our skill and industry was made at Hyde Park in 1851, and, judging from the specimens on the table, and the details given of progress, there was reason to believe that a better display still would be made in the Exhibition of 1862. Mr. Tansley had given the value and particulars of our home trade in this matter, and by way of comparison, and in order to fill up the details he (Mr. Simmonds) would hand in for publication and reference, the statistics of the import and export of straw plait, &c., for the five years ending with 1858, the latest returns published. From these it would be seen that our import from France and Tuscany had declined nearly one-half, while our export averaged more than £43,000 in value, evidencing the activity of the trade, which even supplied foreign markets, besides the increasing consumption at home. Mr. Tansley's paper would, he felt sure, be read and studied with interest by large classes both at home and abroad, and it was a striking evidence of the great importance of very many seemingly small manufactures of the country which only required to be properly described to become much more appreciated.

#### GENERAL IMPORTS.

	1854.	1855.	1856.	1857.	1858.
Plaiting of straw chip } or other material, lb.	207,755	135,864	155,524	203,128	172,333
Cord or net, lbs.	18,057	6,310	7,292	6,834	4,177
Plaiting of chip less } in value than 6d. the }	9,850	9,219	10,409	3,969	4,044
piece of 60 yds. lbs.)					
Willow squares, cwt.	200	287	218	219	242
Hats and bonnets of straw, &c., lbs.	...	37,901	36,852	67,451	35,272
Straw or grass for plaiting, cwt.	...	478	504	165	84

#### COMPUTED TOTAL VALUE OF THE IMPORTS INTO THE UNITED KINGDOM.

	Plaiting.	Hats and Bonnets.
1854 .....	£209,454	£168,543
1855 .....	146,850	81,464
1856 .....	158,023	86,155
1857 .....	154,599	124,300
1858 .....	156,369	93,588

The duty on imports was, from 1853, 2s. 6d. per lb. on hats or bonnets of straw; 2s. per lb. on plaiting, and 6d. per lb. on inferior chip; while willow squares paid 10s. per cwt., and formerly paid as much as 20s. a pound.

#### QUANTITIES AND VALUES OF STRAW PLAITHING AND HATS IMPORTED FROM FRANCE AND TUSCANY.

	FRANCE.		TUSCANY.	
	Quantity. lbs.	£	Quantity. lbs.	£
1854 ...Hats.	37,399	112,197	5,940	17,820
...Plait.	176,926	171,766	20,856	20,248
1855 ...Hats.	14,699	44,098	7,078	21,283
...Plait.	125,425	120,757	3,007	3,007
1856 ...Hats.	19,354	58,062	4,519	13,558
...Plait.	148,220	137,830	4,745	4,745
1857 ...Hats.	24,953	74,860	2,983	8,948
...Plait.	144,398	136,418	4,853	4,853
1858 ...Hats.	17,147	34,616	2,991	8,434
...Plait.	110,994	105,785	12,569	12,569

#### EXPORTS OF PLAITHING OF STRAW.

	Weight. lbs.	Val. of British	Val. of Foreign	Total.
		£	£	£
1854 ...	138,713	40,515	17,472	57,987
1855 ...	101,831	41,145	10,280	51,425
1856 ...	112,285	58,972	7,306	66,277
1857 ...	126,968	46,804	25,455	72,259
1858 ...	82,114	29,810	20,507	50,317
Total ...	561,911	217,246	81,020	298,265
Average	112,382	43,449	16,204	59,653

Straw hats were not particularly specified in the exports.

The CHAIRMAN said, in rising to perform the very agreeable task of proposing, "That the thanks of the meeting be given to Mr. Tansley for the large amount of information he had laid before them on this subject," he would offer one or two remarks. He believed they might fairly congratulate themselves upon having successfully established a trade in this country in opposition to the rivalry of Florence; and, connecting this subject with the one they had before them at the last meeting, it was gratifying to feel that hereafter their competition with Italy would be of a friendly and commercial character. Englishmen would be glad to see the commerce of Italy flourishing as successfully as their own. It was one of the great merits of this Society that it formed itself into a rallying point for the collection of great masses of information upon various subjects. Some of them, like the one before them that evening, might, at first sight, appear of small importance; but in reality, as had been evidenced by Mr. Tansley's able paper, they embraced large interests and exercised an important influence. Though he was himself, in some degree, interested in this article of commerce, he confessed he had not been previously aware of the extent to which this branch of trade had been carried, the number of persons employed in it, or the amount of capital embarked. It was not only an interesting but a curious branch of industry. It afforded, as they had heard, and as they saw by the specimens before them, great opportunities for the display of intelligence and good taste both in the shapes given to the various articles and in the material and the mode of manipulation. Upon an examination of the instruments used in the manufacture, he was sure they would be struck with the talent and ingenuity therein displayed. He gathered from the reading of the paper that wheat straw was now the material principally used in this manufacture. Some friend of his had made experiments in the preparation of grasses in the Orkney Islands with a view of superseding wheat straw and producing a cheaper article, but without success, for it must be remembered that the use of wheat straw enabled the farmer to secure two harvests, one of grain and the other of straw. There was a most useful Association, which he believed the author of the paper had mainly contributed to establish, for promoting honest dealings in the article of plait. In this case as in a great many others, great frauds had been practised, both as to the quantity and quality of the article, and it was very essential that in a place like Luton, where the manufacture was for the most part in the hands of the poorer classes, the lesson of integrity in dealing should be taught. An association was therefore formed and rules were established on the subject of measurement, which afforded an equal amount of protection to the producer and the purchaser. It was an agreeable reflection that so large a number of the poorer classes found in this branch of trade the means of obtaining an honest livelihood. His only fear was that children might be introduced into it at too early an age. Mr. Tansley had mentioned the age of four years, but he believed that remark only applied to the school children, where the objection did not so strongly apply. He thought an expression of feeling on the part of the Society against the too early employment of children would have some

weight if it were communicated to the districts where this manufacture was for the most part carried on. He would take this opportunity of expressing his personal obligations to Mr. Tansley for having brought this interesting subject before them, and he was sure the meeting at large would join in thanking him for his paper.

Mr. ROBERT HOW, as a native of Luton, could not allow this proposition to be put without personally tendering his thanks to his friend Mr. Tansley for so ably introducing this subject, and for bringing under their notice the many beautiful specimens of a manufacture in which he was interested. Mr. Tansley had told them that it afforded employment to many thousands of people. Any person visiting Luton would be impressed with the importance and extent of this manufacture. It was in former years described as a "village," afterwards as a "little dirty town" in Bedfordshire. It was now, he believed, one of the largest towns in the neighbourhood of London. He did not think there was a town within the same distance of London which had a larger population than Luton, and he believed it would compare favourably with any other for order, cleanliness, and morality. He looked upon this manufacture as one of the growing industries of the country. The trade had lately been much depressed, owing to the wetness of the last season; but he hoped, in the next season, under the patronage of our fair countrywomen, extended towards an article of home growth and home manufacture, a great improvement would take place in this branch of industry, and that straw plait articles would be more extensively introduced.

Sir THOMAS PHILLIPS (chairman of the Council) said he might be allowed to do something more than offer a silent acquiescence in the expression of their thanks to Mr. Tansley for his very interesting paper; and he could not help thinking that the labour Mr. Tansley had bestowed in the collection of the numerous and very beautiful specimens of straw plaiting, entitled that gentleman to their best acknowledgments. He hoped the ladies present would not simply admire those specimens of the straw plait of Luton and Dunstable, but that they would more largely extend their patronage to a manufacture which contributed so much to their personal adornment as well as to the livelihood of so large a number of the poorer classes. He could not help thinking it was an interesting subject of contemplation that from 80,000 to 100,000 people were employed in comfort, cleanliness, and moral habits in what might truly be called home occupation. They were all naturally proud of the great development of our manufacturing system; but they might at the same time be proud that some small remnant was left of employment of a not unimportant character for the poorer classes at their own homes. They had been told that this production was brought into the market to the value of a million and a quarter annually, and while it had contributed in a substantial manner to the national necessities, it contributed also to the comfort, respectability and intelligent improvement of those who were engaged in that manufacture. It was a branch of industry which called for the exercise of intelligence in a marked degree. It was obviously of no small importance and interest that the protective duties which straw plait enjoyed up to within the last fifteen years had been removed without injury to the home manufacture, while opening a fair amount of competition to foreign producers. He remembered that the late Sir Robert Peel, in 1844 or 1846, when he introduced the change in the Customs arrangements, produced in the House of Commons a small bundle of straw for the purpose of showing that it was impossible to protect themselves against the arts of the smuggler, inasmuch as in bundles which apparently were of straw there was concealed a certain quantity of plait, so as to evade the duty, and fraud was thus practised on the revenue. He begged to express the gratification which this paper had afforded him, and he was quite sure the meeting would heartily

concur in the expression of their best thanks to Mr. Tansley for the great pains he had bestowed upon his subject.

The vote of thanks having been passed,

MR. TANSLEY said it had afforded him great gratification to prepare this paper, and to bring before their notice the straw manufacture of the country in all its various branches; and since they had been so kind as to express themselves so favourably towards himself, he felt it his duty to state that the numerous specimens before them had been furnished by the leading firms in the straw trade; therefore, to them the praise was due, as well as to himself. He hoped the ladies present would bear in mind the fact that from 70,000 to 80,000 of their own sex were employed in this branch of manufacture, and therefore, by their patronage of it, they would contribute to the moral and social well-being of a very large class of society. When ladies wore straw bonnets they patronised a strictly national article, as they were entirely of home produce, both as to the material and the manufacture; and, happily, it was a portion of female attire which became the ladies of this country better than anything else they could wear. Some remarks had been offered as to the wearing of straw hats by the male sex. He was certain, if the gentlemen of London had the boldness to wear them, they would experience great comfort from them in the hot season, both as to convenience and the preservation of the hair, which suffered considerably from the want of proper ventilation in the hats now generally worn. He had, however, no wish to prejudice the trade of the silk hat manufacturers. The recent improvements that had been introduced, both in the material of plait and the colours, would tend, he believed, to extend the trade very much; and they could not but rejoice at the progress of so important a branch of native industry, and heartily wish it success.

The paper was illustrated by specimens of the various kinds of plaits, and of articles made from them.

The Secretary announced that the next ordinary meeting would be held on Wednesday evening, the 16th January, when a Paper by Dr. Edward Smith, F.R.S., "On Recent Experimental Researches on the nature and action of Alcohols as Food," would be read.

#### EXTRACTS FROM THE REPORTS OF H.B.M. CONSULS.

**CHILI COAL.**—The coal mines of Talcahuano, situated at the ports of Lota and Coronel, both in the bay of Arauco, have been worked since 1851. The quantity of coal raised at Lota in 1854 was about 300 tons per week; the quantity of screened coal raised at Coronel at the same date was about 1,000 tons per week. The coal has been used for some time with great advantage on board the Pacific Steam Navigation Company's steam ship *Nueva Granada*, the master of which reports greatly in its favour. It produces a good deal of smoke, and requires some management. Its heating qualities are considerable, and it is preferred on this account for the use of steamers to English and Welsh coals. Some questions have been raised as to the effect produced on this coal by exposure to air in hot climates, the impression being that it would not maintain its solid condition. It has been alleged that this coal, from the amount of sulphur it contains, would be peculiarly liable to spontaneous combustion, but there does not appear to be any foundation for this impression.

**SUGAR.**—Swatow is the greatest sugar-producing district in China.

**CAMPHOR.**—Considerable and advantageous exports of camphor may be carried on at Amoy. The easy access to

and from Formosa renders it the natural store-house of all the produce of that fertile island.

**SILK Goods.**—Fuh-shan, or Fat-shan, a town about twelve miles west of Canton, is the principal seat of the manufacture of silk piece-goods in China.

**CHILI.**—The Government of Chili in 1854 granted an exclusive privilege for the navigation of the river Bio-Bio by steam, and a boat suited for this purpose, drawing only sixteen inches of water, was obtained from California.

**LUBECK.**—This quaint old Hanseatic city shows unmistakable signs of increasing prosperity, and since Christmas, 1854, it has been lighted with gas.

**COCOA-NUT OIL** is now being produced in great abundance in the Navigation Islands.

**FLOOR CLOTH.**—The manufacture of waxed or oil cloth is a flourishing business in Leipzig; and the designs for floorings, table covers, &c., have much improved of late years.

**RAPE-SEED OIL.**—A new kind of grease, made from this oil, is now manufactured at Leipzig. The mass of grease or fat is quite pure, without taste or smell; and, according to medical certificates, contains nothing in the least injurious to health. In cookery, it answers fully the purpose of butter, with the advantage that instead of the usual quantity of butter, one-third in quantity of the rape-seed grease will suffice.

**IRON ORE.**—The discovery of a considerable field of iron ore at Hof, on the Bavarian-Saxon frontier, gave rise in 1854 to an association for carrying on extensive iron works there, which are to be worked with coals brought from Zurckau. The yield of iron from the ore is estimated at 35 per cent. A railway direct from Zurckau to Hof for the transport of coal would, it is said, give complete success to the undertaking.

**SHEBBORO' ISLAND**, on the western coast of Africa, exports palm oil, palm nuts, rice, canwood, ground nuts, bennie seed, in small quantities, country cloths, ivory, coarse mats, and timber. The production of palm oil, palm nut kernels, ground nuts, and rice is said to be capable of increase to almost any extent, being solely dependent on the peaceful condition of the country.

**COTTON TARIFF, BILBOA, SPAIN.**—The importation of cotton goods is limited to those of twenty-six threads to the quarter of the Spanish inch. This has a most injurious effect, as well on the Spanish exchequer as on the just and honourable trader, by the large contraband trade such restrictions naturally give rise to. This contraband trade appears to have assumed a most systematic form, insurances being, it is stated, regularly effected to cover the risk of seizure. Cotton shirtings are charged a duty at the rate of nearly 39 per cent., whilst printed cotton handkerchiefs pay a duty amounting to upwards of 48 per cent. The duties on velveteens and fustians, articles of large consumption, are most excessive, being on velveteens upwards of 75 per cent. In addition to the above duties, there is an average differential duty of 20 per cent. Duties of from 30 to 40 per cent. are demanded upon such descriptions of linen (chiefly Irish) as are allowed to be imported, and on linen yarns the duties vary from 8 to 30 per cent.

**WOOLLEN AND STUFF Goods**, of a coarse character, were formerly exported to a considerable extent into the Basque provinces, and notwithstanding the excessive duty, in some instances amounting to nearly 120 per cent., they are still in demand, and being too bulky an article for smuggling, moderate importations are still made. The finest descriptions of woollen goods are almost wholly imported from Great Britain and France, the duties varying from 40 to 80 per cent.

**IRON ORE** abounds in the mountains surrounding Bilbao, and gives considerable employment to native industry, and is exported to a large extent to France. This branch

of industry commenced in 1850, and was prospering materially, English vessels being employed to convey cargoes of the ore to England. In March 1852, however, the Spanish Government imposed an export duty on this article, and a differential duty on such of it as was carried in English bottoms, and at once stopped the trade with England.—The ore in question is used in the iron manufactures of Biscay, and to a large extent in an iron foundry adjoining Bilbao.

**COPPER.**—Ore is found in the province of Biscay (Spain) and mines of it are now worked, the ore being shipped to Swansea for smelting.

**WEIGHTS AND MEASURES.**—A new system of weights and measures, published by the King of Sweden, came into operation on the 1st January, 1856. His Majesty has, however, made it optional with the sellers and buyers to make use of the old or new weights and measures until the 1st January 1863, after which time the new weights and measures are alone to be used.

**AGRICULTURE IN SWEDEN** is in a defective state. It is stated that there are 490,000 acres of unimproved land capable of being cultivated. The peasant farmers of the country require to be taught that it is their interest to make use of horses instead of oxen for agricultural labour—that they must drain their land and make available all modern improvements before Sweden (by these means doubling her produce) can afford to become an exporting country.

**THE USE OF BRANDY.**—A curious fact prevails in Sweden in connection with the use of brandy:—A male criminal is condemned, for some crime, to lose his head; on the way to the place of execution he is allowed to stop at a certain public-house where brandy is sold, and he is supplied with a glass of what—to the last—is esteemed by him a great consolation, and what, in all human probability, has paved his way to the block.

**ILLICIT DISTILLATION OF BRANDY IN SWEDEN** goes on to an alarming height, and smuggling from other countries is very prevalent. To put to end to these evils would be most difficult, owing to the nature of the coast and the interminable forests of the country.

**ANNAM, OR COCHIN CHINA.**—The trade with Annam is similar to that of Siam as regards the nature of the products exchanged, sugar, salt, oil, rice, raw silk, and other sundries being the imports received into Singapore in return for opium, piece goods, lead, Spanish dollars, &c., sent from thence. At one time the King of Annam, like the sovereign of Siam, possessed a number of square-rigged vessels, with which he traded to Singapore, whilst he admitted into his ports the ships of all nations, several of which have taken in cargoes direct for Europe. But the unfortunate collisions which the Cochin Chinese have encountered with Western Powers, first, in 1845, when a fortification was battered down by the United States frigate *Constitution*, and secondly, in 1847, when the French frigates *La Gloire* and *La Victorieuse* destroyed in Turon bay the king's fleet of ships, appear to have increased to a high degree of animosity the unfavourable prejudices they had previously conceived against foreigners, and have led to the prohibition of all intercourse with western nations, so that no square-rigged ship of Cochin China is now seen at Singapore, nor are foreign vessels allowed to traffic in Cochin Chinese ports.

**DUNKIRK.**—The articles exported to England from Dunkirk consist chiefly of silks, linseed cakes, wines, fresh fruit, sowing seeds, refuse of wool, animal charcoal and haberdashery.

**NITRATE OF SODA.**—Iquique, in the province of Tarapaca (Peru) in the department of Moquegna, is a small but growing town, meanly built on a sandy plain at the foot of the coast range of hills, which rise here from 3,000 to 3,500 feet. The harbour is safe and commodious, and is protected by the island of Iquique (latitude 20 deg. 13 min. 15 sec. S., longitude 70 deg. 13 min. W.) from the

swell which occasionally sets in during the winter season from the south-west. At Tampaca, the chief town of the province, about 30 leagues distant, resides the sub-prefect. In Iquique are a governor, captain of the Port, Custom-house officials, and two Jueces de Paz; there is only one Consular agent, that of Hamburg, which is at times a source of much annoyance, as in case of any disputes between shipmasters and their crews the vessels have to proceed to some other port where there is a consul.

The steamers of the Pacific Steam Navigation Company call four times monthly; on the 1st and 17th on their way from Panama to Valparaiso, and on the 4th and 19th on their return.

Their tonnage amounts to 15,000 tons annually.

Iquique is the centre of the nitrate of soda trade, and to this article alone it owes its present position. The population of the province is estimated at 15,000, four-fifths of whom are more or less interested in it.

Large and apparently inexhaustible beds of nitrate of soda and other salts are found in the pampa or plain of Iamarugal, say between the Valley of Camarones on the north, and the river Lox (the boundary line of Peru and Bolivia) on the south, a distance of over 150 miles, lying principally towards the western side, distant from the shipping port from 6 to 12 leagues. The beds of nitrate, or calisheras, are insulated deposits, very irregular, some on the plain, others on the rising ground, varying much in size and shape, and in depth beneath the surface crust of earth and clay, from one inch to many feet, and in thickness from six inches to as many feet. Amongst the other salts found in their vicinity may be enumerated carbonate and sulphate of soda, borates of lime and soda, magnesian-alum, chlorate of sodium. Traces of iodine exist in the nitrate, and in most of the waters in the plain have been discovered traces of boracic acid.

The system pursued by the salineros, or makers of nitrate, in its extraction, is very rude (in face of many and expensive experiments to improve it, which have hitherto almost proved useless) and shows but little alteration since the trade was commenced in 1830. The barratero makes a large hole in the ground, and fills it up with a coarse gunpowder made on the spot, sometimes to the extent of 300lbs. blasts, and the quantity thrown out is broken, and the earthy crust separated from it. A carrier with his donkeys then takes it to the works, where it is broken into smaller pieces and the coarser parts separated. That which is chosen is thrown into a large pan into which water has been put, and a fire kindled beneath; it is continually kept in motion by stirring, the stirrer throwing out the earthy or insoluble parts; after boiling from 2 to 4 hours, some mother water is then thrown in; after this it is baled out into a deposit, where it deposits all the earthy particles, and from thence it is removed to shallow coolers where it crystallises.

Its cost at the works varies from  $6\frac{1}{2}$  reales to  $8\frac{1}{2}$  reales per quintal, according to the aptitude of the labourers, and the distance they may have to send for water and fuel. The rate of carriage to the coast also varies from  $5\frac{1}{2}$  to  $7\frac{1}{2}$  reales per quintal.

The average rate now paid for nitrate placed on the beach is 14 reales, and this would give the makers  $\frac{1}{2}$  real per quintal profit. Nitrate of soda is always sold deliverable alongside the ship's launch outside the surf. The merchant has to bag and embark it, which costs him about  $1\frac{1}{2}$  reales per quintal, therefore selling at 17 reales would yield him  $1\frac{1}{2}$  per quintal profit.

A new system, for which a Mr. Gamboni has obtained a privilege, is now being introduced by Mr. Peter King and others; its merits are—saving of fuel and labour, and a greater amount per cent. of nitrate produced.

The caleche is put into an inverted semicone, and a jet of steam is introduced through a perforated bottom, a liquid shortly flows which is received in a canal, and at once conveys itself to the coolers.

The wages now given are to the barratero (miner), and fondeador (boiler of the nitrate), 1 real per quintal of th

nitrate produced each; to the acendrador (who breaks the nitrate and separates the refuse)  $\frac{1}{2}$  real per 2 quintals; to other labourers, 1 dol. 4. to 2 dols. per day.

The principal shipping places are Iquique, Patillos, Mexillones, and Pisagua. The total amount exported to all countries between the years 1830 (when the trade was commenced) and 1854 was 8,036,108 quintals.

#### INDUSTRIAL SOCIETY OF MULHOUSE, FRANCE.

The following is a list of the prizes offered for public competition (open to all Nations) by this Society, and which are to be awarded at its general meeting in May, 1861. The papers are to be sent in before the 15th February, 1861.\*

#### EMILE DOLLFUS' PRIZE (TO BE AWARDED IN MAY, 1869.)

For such a discovery, invention, or application, made during the ten preceding years, as shall be deemed by the said Society to have been the most useful in one of the great branches of industry carried on in the Department of the Upper Rhine.

#### CHEMICAL ARTS.

1. For a theory of the manufacture of Adrianople red—*Silver medal.*
2. For a useful process for calico printing—*£100. or gold, silver, or bronze medal.*
3. For a metallic alloy suitable for making scrapers of rollers (doctors)—*Gold medal.*
4. For providing the manufactories of the Upper Rhine with 2,000 kilog. [about 2,400lbs.] at least, or the equivalent quantity in powder, of madder-root, grown in the same year in a single property in Algeria; or for half of said quantity, under the same conditions—*Gold medal and silver medal.*
5. For a practical means of ascertaining the adulteration of oils—*Silver medal.*
6. For an important improvement in bleaching wool. *Silver medal.*
7. For the best treatise on bleaching fabrics made of unbleached cotton.—*Silver medal.*
8. For a table of the chemical proportions of organic colouring matters—*Silver medal.*
9. For a treatise on the natural organic mordants of wool, silk, cotton, &c.—*Silver medal.*
10. For a means of rendering murexide reds less liable to alteration when exposed to sulphurous vapours—*Gold medal.*
11. For a treatise on the manufacture of extracts of dye-woods—*Bronze medal.*
12. For a considerable improvement in engraving rollers—*Silver medal.*
13. For the best system of vats for dyeing and washing—*Silver medal.*
14. For the manufacture of an ultramarine which is not liable to alteration when thickened with albumen and fixed by steam in the ordinary manner—*Silver medal.*
15. For the theory of the cotton unsuitable for colouring, known under the name of dead cotton—*Silver medal.*
16. For the discovery or oxynaphthalic acid, or for a preparation of chloroxynaphthalic acids, or for a treatise on the application of Laurent's colours to dyeing and to calico printing—*Gold medal.*
17. For a process of dyeing or calico printing by means of alkaloids—*Gold medal.*
18. For a metallic red colour, or metallic deep green, or metallic violet colour, which may be used in cylinder printing with albumen—*Gold medal.*

\* Detailed programmes may be obtained of the Industrial Society, Mulhouse, and a copy of the French original may be seen at the House of the Society of Arts, John-street, Adelphi

19. For introducing hydroferrocyanic acid, or ferrocyanides of calcium or barium into commerce—*Silver medal.*
20. For preparing dark madder lake by means of iron and alumina—*Silver medal.*
21. For the best practical manuals—1st on engraving printing rollers; 2nd on engraving plates for printing; 3rd on bleaching tissues of cotton, wool, wool and cotton, silk, hemp, and flax (according to the merit of the work)—*Gold, silver, or bronze medal.*
22. For the best treatise on catechu—*Silver medal.*
23. For the employment on a large scale of ozone in calico printing—*Silver medal.*
24. For a substance for thickening colours, and sizes, whereby a saving of at least 25 per cent. is obtained—£200.
25. For a treatise on the action of ammonia upon colouring matters—*Silver medal.*
26. For a work on aniline red, aniline blue, and the secondary products of aniline violet—*Gold medal.*
27. For a treatise on the best mode of obtaining benzine in distilling fuel—*Silver medal.*
28. For a means of fixing coal-grey colours otherwise and better than by albumen—*Silver medal.*
29. For a treatise indicating how molecular substitutions affect organic coloured compounds—*Silver medal.*
30. For an analysis of the Lokao, or China-green—*Bronze medal.*
31. For applying the action of light or electricity on colouring substances, or on substances colouring by those agents, to calico printing—*Gold medal.*
32. For a new and practical application of light or electricity to calico printing—*Gold medal.*
33. For a substance superseding in every respect the dry albumen of eggs in calico printing, and whereby a saving of 25 per cent. is obtained on the price of albumen. The albumen of blood, if thoroughly decoloured, will be admitted to competition—£700 and *gold medal.*
34. For introducing alizarine into commerce—*Gold medal.*
35. For a treatise on the possibility of reproducing indigo from its sulphuric compounds—*Bronze medal.*
36. For separating the white of eggs from the yolks when mixed together—*Gold medal.*
37. For a treatise on the degrees of dampness and heat that are most suitable for the quick decomposition of acetate mordants—*Silver medal.*
38. For a treatise on the chemical composition of the fire-bricks used in Alsacia—*Silver medal.*
39. For a new source of aniline other than nitrobenzide—*Silver medal.*
40. For a treatise on the use of resins in bleaching calico—*Silver medal.*
41. For a new use for the yolks of eggs—*Gold medal.*
42. For a starch for sizing well the fag-ends of pieces of calico—*Silver medal and £40.*

#### MACHINERY.

1. For a treatise on spinning cotton, Nos. 80 to 200 (metrical system)—*Gold medal.*
2. For the manufacture and sale of new textile fabrics in the Department of the Upper Rhine—*Silver medal.*
3. For the best essay on the purification of the different kind of oils suitable for lubricating machinery—*Gold medal worth £20.*
4. For an improved construction of cards for carding cotton—*Silver medal.*
5. For a treatise on the movement and cooling of steam in large pipes—*Silver medal.*
6. For a complete treatise on the transmission of movement—*Gold medal.*
7. For detailed plans and a complete description of all machines used for spinning combed wool according to the best-known systems—*Silver medal.*
8. For a rotatory steam-engine—*Gold medal worth £40.*
9. For the invention and application of a machine, or series of machines, for preparing long-stapled cotton for combing with greater advantage than by the known processes—*Gold medal worth £80.*
10. For the invention and application of a machine, or a series of machines, for opening and cleaning short-stapled cotton, and preparing the same for carding, purifying, combing, &c.—*Gold medal worth £40.*
11. For the invention and application of a combing machine, or a series of combing machines, for short-stapled cotton, which, like Heilmann's combing machine, may be advantageously substituted for the ordinary carding, battting or scutching, and blowing machinery—*Gold medal worth £40.*
12. For a treatise on the construction of buildings and the arrangement of machines for cotton spinning or power-loom weaving—*Gold medal.*
13. For the best arrangements to be adopted in the manufactories of the Upper Rhine for the purpose of preventing accidents—*Gold medal.*
14. For a new washing or scouring machine—*Gold medal.*
15. For a treatise on heating manufactories, and particularly cotton mills, by steam—*Silver medal.*
16. For a more economical mode of packing thread (of gold or silver) on bobbins or in cans than that usually adopted—*Silver medal.*
17. For a complete project of stopping the water of any stream of the Upper Rhine, for the purpose of preventing inundations, and forming a reservoir for agricultural and industrial purposes—*Gold medal worth £40.*
18. For the invention and application of a steam meter—*Gold medal.*
19. For the invention and application of a water meter applicable to steam generators—*Gold medal worth £60.*
20. For a means of ascertaining the amount of water carried off with the steam from steam boilers—*Gold medal.*
21. For a pump or other apparatus to be employed in bleach works for filling vats with the solutions of acids used in bleaching fabrics—*Silver medal.*
22. For a treatise on the motive-power necessary for working the different machines of a cotton mill or power-loom factory—*Gold medal.*
23. For the best essays, under the form of manuals, on the following subjects, and chiefly intended for the use of foremen, overseers, or workmen; viz., cotton spinning, spinning combed wool, cotton weaving, twisting cotton, wool, or silk; manufacture of paper; construction of machines (according to the respective merits of the works)—*Two gold medals, two silver medals, two bronze medals.*
24. For a treatise on the construction of ground floors for cotton mills and power-loom factories—*Gold medal.*
25. For the invention and application of a registering dynamometer—*Gold medal.*
26. For the invention and application in a manufactory of the Upper Rhine of an apparatus or contrivance for protecting workmen from accidents caused by machines or apparatus for transmitting power—*Silver medal.*
27. For plans and specifications of houses similar to those of the Mulhouse *cités ouvrières*, offering an economy of 20 per cent. on the cost price of those already constructed—£240.
28. For an improved construction of tubular boilers—*Gold medal.*
29. For an analysis of the gases issuing from the chimneys of boilers—*Gold medal.*
30. For the manufacture and sale in the department of the Upper Rhine of less costly bricks than those in present use—*Gold medal.*
31. For a process of separating the calcareous and other salts contained in the water of the Mulhouse wells, in reservoirs outside the boilers—*Gold medal and £40.*
32. For the most expert firemen of stationary engines—*5 Silver medals, and £4, £2, or £1.*

## NATURAL HISTORY AND AGRICULTURE.

1. For a geognostic or mineralogical description of any part of the Department of the Upper Rhine—*Silver or bronze medal.*
2. For planting, in the districts of Mulhouse or Belfort, 4,000 to 1,000 hop plants—*Silver or bronze medal.*
3. For an analytical index of the plants of either the districts of Mulhouse or Belfort, or only of one or several cantons of those districts—*Silver or bronze medal.*
4. For a work on the Fauna of Alsatia—*Silver medal.*
5. For a work on the cellular cryptogamæ of the Upper Rhine—*Silver or bronze medal.*

## MANUFACTURE OF PAPER.

1. For importing into France a filamentous substance in the state of half-stuff, which may be applied to the manufacture of paper—*Gold medal and a premium of £160.*
2. For the best treatise on decolorizing and bleaching rags—*Gold medal worth £20.*
3. For introducing into commerce 500 kilos. [about 1,000 lbs.] at least of paper, having all the qualities required for photographic purposes—*Silver medal.*

## VARIOUS PRIZES.

1. For an important improvement in any branch of industry of the Department—*Gold, silver, or bronze medal.*
2. For introducing a new branch of industry into the Department of the Upper Rhine, or for a treatise on those branches of industry which might be improved or established in said Department—*Gold, silver, or bronze medal.*
3. For having, before the 30th April, 1861, caused the discontinuance of the use of wood in at least 150 workmen's households, and the substitution therefor of the more economical use of coal—£40.

## PATERA'S PROCESS FOR EXTRACTING SILVER FROM ITS ORES.

BY CLEMENT LE NEVE FOSTER.

The process in question was originally suggested by Dr. Percy, F.R.S., of the Government School of Mines, and has been of late years taken up and carried out on a large scale by one of the most celebrated metallurgical chemists in Austria, viz., Herr von Patera. This process is of special interest, on account of the analogy it presents with the well-known "fixing" in photography, which is nothing more than dissolving out the chloride of silver (which has not been acted on by light) by means of hyposulphite of soda.

In the metallurgical process this property is made use of in the following manner:—The ores which contain the silver in combination with sulphur, or with sulphur and arsenic, are roasted with green vitriol and common salt, and thus is produced a chloride of silver which may be dissolved out by a solution of hyposulphite. The silver can then be precipitated by sulphide of sodium, falling down as sulphide of silver. All that is necessary to be done then is to heat the sulphide in a muffle in contact with the atmosphere; the sulphur escapes in the form of sulphurous acid, and the silver remains in the metallic state. It is then melted in plumbago pots and cast into ingots for the mint. Such is a rough outline of the process which is now, and has been for some years, in operation at Joachimsthal, on the northern frontier of Bohemia. The ores which are subjected to this process are rich in silver, containing on an average two per cent., but often as much as 10 per cent. Ores containing less than one per cent. are melted down with pyrites in a cupola blast furnace for regulus or matte, which is then treated as the ore.

The advantages of this process are manifold, 1stly, Ores containing large amounts of arsenic can be thus successfully treated, when Ziervogel's process would fail. 2ndly. The expense of heating a strong solution of salt, as in Augustin's

process, is got rid of, as the hypo-sulphite is used cold. 3rdly. The hypo-sulphite filters quicker and better than the brine in Augustin's process, for the dissolving power of hyposulphite being great, a weak solution may be used. 4thly. The solution of hyposulphite may be used over and over again, for it is being continually renewed, and as this is one of the peculiar points in the process, it deserves particular attention. The precipitation of the silver is effected, as has been before stated, by sulphide of sodium, and this is a polysulphide, for it is prepared by calcining soda with sulphur and then boiling it with sulphur. In this manner a polysulphide of sodium is formed, but in contact with the air some hyposulphite of soda is generated, and thus, each time that the silver is precipitated, some hyposulphite of soda is added to the solution. In this way Herr von Patera, who commenced with 14lbs. of hyposulphite of soda (and who yearly extracts more than 3,000lbs. of silver), has never needed a fresh supply, and has, in fact, been obliged to throw away quantities of solution, as his stock was always increasing. The expense of this process is not great; the extraction of a pound of silver from the ore costs, on an average, only 9s. 9d., whilst by the method of smelting formerly in use, the cost of production of a similar quantity of metal was no less than 16s.

## OIL WELLS.

A new article of commerce from America seems likely soon to attract much attention. On the western border of New York State, at a place called Union Mills, some working men a year or two back observed a quantity of dark oily matter floating on pools abounding in that district. Subsequent experiments led to the discovery that the oil is highly adaptable for illuminating purposes, and that by sinking wells to the depth of from 70 to 500 feet it can readily be obtained throughout a very extensive area. Indeed, it is said already to have been ascertained to be dispersed over 100 square miles. The proportion of oil in the liquid pumped up is about one-third, and the process of separation is very simple. Land in the locality has become exceedingly valuable, and the business is rapidly increasing. About 1,200 to 1,500 barrels, containing 40 gallons each, are now, it is said, being raised daily and sent to New York, where, when rectified, it sells in any quantity at a price equal to 3s. sterling per gallon. There is a residuum, also, which is described as being used for the manufacture of superior candles. Many shipments of the oil have been made to Australia. In addition to its illuminating capacity it is alleged likewise to be suitable, when mixed with fish oil, for the process of lubrication.

## AUSTRALIA.

The *Times* of the 18th instant states, that the news by the present steamer from Australia is in one respect the most important ever received. The problem as to the possibility of crossing the continent from South to North has been virtually solved, and no question now remains that a land transit may be opened up, available, not only for the general purposes of commerce, but also for telegraphic communication. Mt. Stuart, who started from Adelaide about last March on an exploring expedition, with two companions and a number of horses, has returned, after having crossed the country to a distance of about 1,600 miles from Adelaide and to within 300 miles of the Victoria river. Here he was turned back by a body of hostile natives; but, as he had already reached 100 miles further north than the point to which Gregory's expedition in 1856 descended from the Victoria, the continent may be considered, by the joint results of these surveys, to have been fairly opened up from one end to the other. Instead of an arid desert, it is described to be a practicable country throughout. The full details of the

observations made were for the present, however, kept secret, the Parliament of South Australia having voted £2,500 to enable Mr. Stuart to start again with a larger and more strongly organised party, and a desire being entertained to prevent the triumph of final success being snatched from him by rival explorers in the other colonies, who might hastily avail themselves of all his information. Still, enough had been allowed to transpire to give a general idea of the route traversed. Mr. Stuart and his companions suffered terribly from want, not only of water, but of food, and also from an attack of scurvy. The part of the route in which water was totally absent, however, was only 60 miles. In many parts there was fine grass, besides splendid gum and other trees, including at least four kinds of palm. A very large salt lake was also discovered in the interior, supposed, from the blueness of its water, to be of great depth. The event had created great excitement and rejoicing at Adelaide, and the general impression was that a number of new provinces would ultimately be formed in the territory thus explored, and that meanwhile the tract might be made available almost immediately to facilitate communication with India, and especially the export trade in horses. The new expedition, which was to start immediately, would consist of Mr. Stuart and one of his former companions, ten other well-armed men, and a suitable number of horses.

#### STEAM NAVIGATION ON CANALS.

It is stated that the Grand Junction Canal Company have brought into use steam power for canal navigation, which if successful will materially reduce the cost of conveyance. The peculiar feature in the steamboats employed to ply between London and Birmingham or Manchester is a form of screw propeller, invented by Mr. Burch, of Macclesfield. This "waggle tail" propeller is said to have the advantage of keeping all the disturbance of the water immediately behind the stern of the boat, instead of spreading it right and left, thus securing the canal banks from being damaged by the wash, and economising the motive power. On Tuesday last, the 18th inst., a party of gentlemen accompanied Mr. James Fulton, one of the company's officers, in a trip from the City Basin along the Regent's Canal to Paddington, a distance of five miles and three quarters, which was accomplished in an hour and a half, including the passage of five locks, and the Islington tunnel, half a mile long. The *Pioneer*, an ordinary fly-boat, 75 feet long by 7 feet extreme breadth, 25 tons burden, and drawing 2½ feet of water, with an engine of six-horse power, was the boat employed, towing another fly-boat which was laden with a general cargo to go to Wolverhampton. The two boats were able to go through the locks at once, floating side by side, and thus saving much delay. It is stated that the *Pioneer*, when tried at Manchester, proved able to draw six loaded barges at once, with a total burden of no less than 300 tons. Four miles an hour, allowing for the locks and other hindrances, it is estimated will be the average rate of steam performance, instead of two miles an hour, the usual speed obtained by horse-towing. The steamboat has stowage room for 2½ tons of coal, which will carry her from London to Birmingham and half-way back, superseding the expensive relays of horses and drivers requisite for so long a journey. This water locomotive is estimated to be nearly 30 per cent. cheaper than railway carriage.

It may be observed that the aggregate amount of canal traffic, instead of diminishing, has increased since the construction of railways, and is now 25,000 tons more than it previously was. The total length of canals now open in Great Britain is about 5,000 miles, including all the branch lines and junctions, and these works represent a capital of some forty millions.

#### Home Correspondence.

##### ELECTRO BLOCK PRINTING.

SIR,—I must apologise for taking up your valuable space in answering your correspondent Mr. William Stones; but as he has, through your *Journal*, questioned my right of patent, I must solicit your indulgence for a reply. Had he carefully read the discussion which followed, and particularly the remarks of Mr. Hanhart, he would have seen that the drum machine was fully alluded to and acknowledged by me as having been exhibited at the Paris Exhibition by Mons. Célérin; but, like Mr. J. Murdoch's, it was totally behind the wants of the day, for while they printed *on* to a sheet of rubber, I print *from* a sheet of rubber, and am enabled to give any required number of impressions from the ordinary lithographic printing press. Mr. Stones' complaint reminds me of the Frenchman who, while boasting that his countryman had invented the shirt frill, was reminded by an Englishman that it was his countryman who had invented the shirt.

I am, &c.,  
H. G. COLLINS.

##### COPYING PICTURES IN PUBLIC GALLERIES.

SIR,—A paragraph, headed "Artistic Copyright," in your *Journal* for December 7th, calls attention to the number of persons engaged in copying the pictures in our public galleries, and advocates its being put a stop to. The grounds on which this repressive measure is advocated are—that the copiers are not students—the copies are sold to dealers who resell them as originals—and that the copying of these pictures serves rather to injure than to promote Art.

Having had for many years both friends and acquaintance engaged in the galleries, I am enabled to form a pretty accurate opinion as to the motives they have in making copies, and am inclined to divide them thus:—

1. Artists whose business consists in copying for sale.
2. Students copying for improvement.
3. Artists desirous of copying a particular master, to keep as a memorandum.

4. Amateurs copying for amusement and improvement. Of the first, many are engaged in making copies for private commissions (which can scarcely be considered objectionable), or for engravers' use; the latter involves a separate question altogether—viz., artists' copyright in public property. Of the copies made by classes 1 and 2, many are no doubt purchased by dealers, but as selling them as originals is punishable by an action at common law, there needs no fresh Act to stop it. Of the 3rd and 4th classes, few are ever sold.

When the Vernon Gallery was first offered to the public, a rule existed which permitted no copies to be taken. This regulation gave great dissatisfaction, and was subsequently rescinded.

I should be loth to see the Society of Arts countenance a step that I cannot but consider as retrograde; and, so thinking, I enter my humble protest against the article referred to, which, I am of opinion, takes an exaggerated view of the evil, and overlooks the many benefits the privilege confers upon Art students.

I am, &c., F. W. R.

Dec. 14, 1860.

#### Proceedings of Institutions.

WINDSOR AND ETON LITERARY, SCIENTIFIC AND MECHANICS' INSTITUTION.—The half-yearly general meeting was held on Monday evening, Dec. 4th, in the lecture hall of the Institute—there was a full attendance of members. In the unavoidable absence of the President, W. R.

Harris, Esq., of Clever House, was requested, as Vice-President, to take the chair. After the minutes of the previous meetings had been read and confirmed, Mr. C. T. Phillips, who has occupied the post of Honorary Corresponding Secretary for upwards of seven years, resigned his office. The report and balance-sheet were therefore read by the Honorary Financial Secretary, Mr. Chamberlain. From these documents it would appear that, while the Society is not so flourishing as it has been, it is still in a far better position than many of its neighbours. The balance in hand at last audit, £22 13s. 6d., has been increased to £38 7s. 8d., besides £30 (with interest) invested some years since as the nucleus of a new building fund—the liabilities amounting to about the sum in hand and due to the Society. The library has been increased by the purchase of several new books, 46 volumes having been ordered this half-year. The success of the last *fête* was referred to, and the loss the Society would incur, through the resignation of Mr. Phillips, was alluded to, his very valuable services to the body being gratefully noticed. The report and balance-sheet were unanimously received and adopted, it being resolved that copies of them should be sent to H.R.H. the Prince Consort, as patron of the Society. Captain Bulkeley was then unanimously selected President, B. C. Durant, Esq., as Honorary Corresponding Secretary, in the room of Mr. Phillips; six members to serve on the Committee and two auditors. A highly complimentary and cordial vote of thanks was carried to Mr. Phillips for his invaluable services, on the proposition of his colleague, Mr. Chamberlain and the Honorary Librarian, Mr. Lundy; and a further resolution was carried, with equal unanimity, to the effect that a testimonial should be subscribed for by the members generally, and be presented to Mr. Phillips as a slight acknowledgment of the appreciation in which his services were held by the Society, a committee to carry out the resolution being at once appointed. The following votes of thanks were passed:—1st. To the committee and officers of the Society, unanimously; 2nd, to the gratuitous lectures; 3rd, to Copperill Scholefield, Esq., for the very kind use of his grounds on the occasion of the late *fête*; 4th, to the Honorary Secretaries of that *fête*; and 5th, to the local press. An alteration in the rules was then effected, after considerable discussion, as was a resolution, requesting the Committee to take steps towards holding a *soirée* next January, and the meeting was concluded by a vote of thanks to W. R. Harris, Esq., for his efficient conduct in the chair.

#### MEETINGS FOR THE ENSUING WEEK.

- THURS... Royal Inst. 3. Professor Faraday, "On the Chemical History of a Candle." Philological, 8.  
SAT. ... Royal Inst. 3. Prof. Faraday, "On the Chemical History of a Candle."

#### PATENT LAW AMENDMENT ACT.

##### APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[From Gazette, December 1<sup>st</sup>, 1860.]

Dated 23rd November, 1860.

2866. J. Venables, Burleson, Staffordshire—An improved mode or modes of ornamenting the surfaces of earthenware, also applicable to the ornamenting of other useful articles.  
2867. G. E. Dering, Lockleys, near Welwyn, Hertfordshire—Imp. in the permanent ways of railways.  
2868. J. F. Carson, 4, South-street, Finsbury—Imp. in treating cætetash. (A com.)  
2869. E. Monkhouse, 6, Caledonian-terrace, Cooks-ground, St. Luke, Chelsea—Imp. in the construction and manufacture, and the fixing or fastening, and the mobility, adjustment and re-adjustment of circular and polygonal bell plates for boots, shoes, and clogs.  
2871. E. Keirly, Gatehead Mill, Greetland, near Halifax—Imp. in covering insulating and preserving telegraphic wires and cables.  
2873. J. Ancerson, 92, Farringdon-street—Imp. in preparing potatoes for boiling or cooking.
2875. C. Humfrey and C. Humfrey, jun., Wareham, Dorsetshire—Imp. in distilling coal and peat, and bituminous and coaly minerals, and in the treatment of the products therefrom.  
2876. G. Bartholomew, Linlithgow, N.B.—Imp. in boots, shoes, clogs, and galo-hes.  
2877. E. Izod and R. Beech, 134, Grocers Hall-court, Poultry—Imp. in the manufacture of stay cloth.  
2878. T. Gamble and E. Ellis, Nottingham—Imp. in machinery for producing loomed fabrics.  
2879. T. Hale, 21, Barnesbury-row, Park-road, Islington, and A. Wall, Canton street, East India-road—Imp. in the construction and internal arrangement of furnaces, and in the preparation, manufacture, and treatment of clays and bricks, and other articles made of clay, earthenware, or stone, used for the above and other structures.

Dated 24th November, 1860.

2882. W. R. Bowditch, St. Andrews, Wakefield—Imp. in the purification of coal gas and of coal oils.  
2884. C. R. N. Palmer, Southampton—A new portable and improved fixed signal apparatus.  
2886. J. H. Johnson, 47, Lincoln's-inn-fields—Imp. in sewing machines. (A com.)

##### INVENTION WITH COMPLETE SPECIFICATION FILED.

2942. C. Stevens, 1B, Welbeck-street, Cavendish-square—Imp. in smoke consuming furnaces. (A com.)—30th November, 1860.

[From Gazette, December 14<sup>th</sup>, 1860.]

Dated 28th August, 1860.

2075. F. C. Calvert, Manchester—Collecting and saving certain products given off or emitted during the manufacture of smoke.

Dated 31st October, 1860.

2861. T. G. Chislin, 24, Southampton-row, Russell-square—Preparing, applying, and adapting certain articles of vegetable production called Elckonia buccinalis, Proteaceæ, Juncus Serratus, Juncus Trista, and Amaryllidæ, to further new purposes of manufacture."

Dated 2nd November, 1860.

2879. J. Chaumnonot-Delarothe, 4, South-street, Finsbury—Some imp. in stocking frames.

Dated 3rd November, 1860.

2698. R. B. Pilliner, 4, Hatfield-street, Stamford-street, Blackfriars-road, Southwark—Imp. in machinery for compressing black lead or other suitable substances part of which improvements are also applicable to packing various other materials.

Dated 16th November, 1860.

2819. B. Fleet, East-street, Walworth, Surrey—Imp. in apparatus for cutting and rounding wood.

Dated 17th November, 1860.

2834. J. Hogg, senr., Edinburgh, and J. Hogg, jun., and J. Hogg, London—Imp. in ornamenting the edges of cloth bound books.

Dated 21st November, 1860.

2854. J. Howden, Glasgow—Imp. in steam engines and boilers, and in the apparatus connected therewith.

Dated 22nd November, 1860.

2862. R. Jobson, Dudley, Worcestershire—Imp. in moulding articles of earthenware or porcelain, and in apparatus used therein.

Dated 24th November, 1860.

2881. A. A. Dalglash, Glasgow—Imp. in engraving or for producing printed surfaces.

2883. R. Harrison, Bacup, and C. Taylor—Imp. in machinery or apparatus for preparing cotton and other fibrous substances for spinning.

2885. S. Walker, jun., Edgbaston, Warwickshire—New or improved machinery to be used in the manufacture of twisted, reeded, and other ornamental metallic tubes.

2867. T. Benton, Sheffield—Imp. in the manufacture of bells, and in alloys of metals to be used in the manufacture of bells.

2889. J. Fowler, jun., R. Burton, and D. Greig, Leeds—Imp. in apparatus for raising, lowering, and hauling weights.

2891. W. Leigh, Goulden-terrace, Richmond-road, Dalston—An improved indicator for railway carriages.

Dated 26th November, 1860.

2893. W. Pearson, W. Spurr, and T. Smith, Bristol—Imp. in looms for weaving woollens.

2895. G. F. Train, Liverpool—Imp. in steam carriages, and in the running gear for street and other railways.—(A com.)

2896. T. Moy, Clifford's-inn—Imp. in direct-action steam engines and pumps.

2897. W. R. Shiptcliffe, Spring-lane, Sheffield—Imp. in warm baths.

2898. J. Birket, Pemberton-village, near Wigan—Improved musical instruments, particularly applicable to pianofortes and other such like instruments.

2899. S. Roberts, Hull—Imp. in harrows.

2900. G. Mackenzie, Paisley, and J. Hamilton, Glasgow—Imp. in bobbin, or holder, for textile materials.

2901. R. Oxland, Plymouth—Imp. in the manufacture of gunpowder.

2902. P. Hugon, Paris—An improved mode of firing or igniting explosive gaseous compounds in motive power engines.

2903. C. H. Jacquet, Lyons—An improved calendar clock.  
 2904. I. Sharp, and W. Bulmer, Middlesborough, Yorkshire—Imp. in apparatuses for the manufacture and for the drying of bricks, tiles, and other like ware.  
 2905. F. Seiler, Paris.—An improved apparatus applicable to ships' boats and other navigable vessels, for preventing the dangers of shipwreck at sea or in rivers, and for diminishing their draught of water.  
 2906. G. Ennis, Jersey—An improved construction of oyster dredger.  
 2907. J. S. Manton and T. Islip, Birmingham—Certain improved compositions useful for many purposes in connection with the arts and manufactures, and in machinery or apparatus to be employed therewith, which machinery or apparatus is also applicable to several other purposes of utility.

Dated 27th November, 1860.

2909. R. Robertson, Glasgow—Imp. in machinery or apparatus for preparing asphaltum.  
 2910. V. Wanostrocht, Parkstone, near Poole, Dorsetshire—An imp. in the manufacture of mineral tar.  
 2912. J. Fowler, Waterford—Imp. in boots, shoes, gaiters, leggings, and overshoes.  
 2912. J. Smethurst, Guide Bridge, Lancashire—Imp. in slide valves of steam engines, and for other purposes where slide valves are employed.  
 2913. F. S. Beatty, 16, College-green, and T. Alexander, Kilesterhouse, Dublin—Imp. in the production of photographic proofs, and their application to printing purposes.  
 2914. T. Pape, Nottingham—Imp. in circular frames for manufacturing glove and other fabrics, and in apparatus for stitching and finishing the finger-ends of gloves, and for "boarding" gloves.

Dated 28th November, 1860.

2915. J. B. Lecomte-Aliot, Paris—A machine for waxing and rubbing apartments.  
 2917. J. Sidebottom, Harewood, near Mottram, Chester—Imp. in reeds, and in apparatus for forming the lease or shed i. machines for sizing, dressing, warping, and weaving.  
 2918. R. Thomas, Bath-street, Tabernacle-square—Imp. in venetian blinds for windows.  
 2919. D. Mardell, York-terrace, York-square, Commercial-road East—Imp. in steam engines, and in obtaining feed-water for marine steam-engine boilers.  
 2921. H. Grafton, 80, Chancery-lane—Imp. in apparatus or machinery for cultivating land.  
 2922. J. Reeves, Brooklyn, New York—Imp. in the construction of ships.  
 2923. H. Gillett, Regent-street—Imp. in the ornamentation of the edges of the leaves of photographic albums, especially intended for "cartes de visite".  
 2924. N. Age, 77, Upper Ebury-street, Pimlico—Imp. in apparatus for raising building materials.  
 2925. T. Holmes, Anlaby-road, Hull—Imp. in preparing and in tanning hides and skins.  
 2926. S. Thomson, Motherwell, Lanark, N. B.—Imp. in the manufacture of iron.  
 2927. J. Joyce, 17, Cheyne-walk, Chelsea—Imp. in the manufacture of boots and shoes.

Dated 29th November, 1860.

2929. H. Gilbee, 4, South-street, Finsbury—Imp. in welding. (A com.)  
 2930. H. Hirsch, Bridge-road, Lambeth—Imp. in screw-propellers.  
 2931. W. Darley, Bishop Bridge, Market Rasen, Lincolnshire—Imp. in portable steam engines.  
 2932. R. Offord, jun., 79, Wells-street, Oxford-street—Imp. in the adaptation of india rubber and compounds thereto to wheels.  
 2933. W. M. Storn, New York—Imp. in the construction of breech-loading fire-arms.  
 2934. J. A. Jaques and J. A. Fanshawe, Tottenham, and G. Jaques, Bromley—An improved mode of and apparatus for cooling liquids.  
 2936. T. Cole and D. Gardner, Coventry—Imp. in looms for weaving ribbons and other fabrics.

Dated 30th November, 1860.

2939. E. C. Perry, Sedgley, Staffordshire—Imp. in preventing accidents in or at mine shafts.  
 2940. G. Parsons, Martock, Somersetshire—Imp. in the construction of wheels.  
 2941. E. T. Hughes, 123, Chancery-lane—Imp. in the manufacture of metal tubes. (A com.)  
 2943. J. Peligrin, Bourdeaux, France—Inodorous basins and descent pipes of glass.  
 2944. R. C. Newberry, 4 and 5, President-street West, Goswell-road—Imp. in the manufacture of collars and wristbands.

Dated 1st December, 1860.

2946. H. Greaves, 22, Abingdon-street, Westminster—Imp. in the construction of railways, tramways, and in vehicles to run thereon, portions of which improvements are applicable to other useful purposes.  
 2948. C. Farmer and W. Farmer, Birmingham—New or improved machinery for the manufacture of the hooks used principally as dress fastenings.  
 2949. W. S. Losb, Wreay Syke, Cumberland—A new method of preparing sulphurous acid in solution.  
 2950. W. L. Tizard, Mark-lane—Imp. in fastening threaded nuts and bolts.

2851. R. Marsden, 22, Anson-street, Park, and W. Lamber, 9, Castle-hill, Sheffield—An imp. in horses shoes.  
 2953. J. Austin, Donaghadee, Ireland—Imp. in machinery or apparatus for ploughing or cultivating land, part of which machinery or apparatus may be used as a traction engine.  
 2855. W. Clark, 53, Chancery-lane—Imp. in looms. (A com.)  
 2956. A. Leonhardt, Berlin—Imp. in the preparation of indigo for dyeing and printing, and in obtaining "pure" or "refined" indigo.

Dated 3rd December, 1860.

2957. W. P. Piggott, 16 Argyll-street, Regent-street—Imp. in the mode of generating electric currents, manufacturing submarine telegraph cables, and the mode of transmitting signals.  
 2959. W. Pittkington, Windle-hall, Lancashire—Imp. in furnaces for melting glass.  
 2961. T. Richardson, Newcastle upon-Tyne—Imp. in the manufacture of paper.  
 2963. E. T. Hughes, 123, Chancery-lane—Imp. in treating and decomposing fatty matters, and in the machinery or apparatus employed therein. (A com.)  
 2965. R. A. Broome, 166, Fleet-street—Imp. in valves for closets and other receptacles. (A com.)  
 2967. G. Macfarlane, Draycott street, W. E. Newton, 66, Chancery-lane, and R. Carte, Charing-cross—Imp. in wind musical instruments.

Dated 4th December, 1860.

2969. W. R. Jeune, 4, Flower terrace, Campbell-road, Bow—Imp. in the manufacture of kamptulicon or covering for floors, and for other purposes.  
 2971. E. H. Higginbotham and A. Beech, Macclesfield—Certain imp. in machinery or apparatus for the prevention of explosions of steam boilers, arising through deficiency of water or over-pressure of steam.  
 2973. W. T. Walter, Long-acre, and C. Henry, Bartholomew-place Hertford-road, Kingsland—Imp. in means or processes for obtaining ornamental and other devices or effects on metal glass, stone, and earthenware.  
 2975. F. Michaux, Anzin, France—A new sort of "safety lamp for mines."

#### INVENTION WITH COMPLETE SPECIFICATION FILED.

3039. A. Verwey, 3, Croydon-grove, Croydon—Imp. in the proportion of ingredients and mode of manufacture of a chemical compound for softening water.—11th December, 1860.

#### PATENTS SEALED.

[From Gazette, December 14th, 1860.]

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| December 14th.<br>1476. T. Kershaw.<br>1480. T. W. Keates.<br>1485. J. Harrison.<br>1486. J. Walker.<br>1489. W. Kendall and G. Gent.<br>1491. W. W. Sleigh.<br>1497. H. F. Hiron and R. Fell. | 1508. W. P. Eastman.<br>1510. W. Clark.<br>1512. A. T. Clark and J. Price.<br>1514. A. Jutteau.<br>1532. H. J. N.<br>1554. J. Fletcher.<br>1555. G. T. Leppé.<br>1663. F. Boxx. |
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[From Gazette, December 18th, 1860.]

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| December 18th.<br>1504. W. A. Munn.<br>1505. D. Lee and A. Welsh.<br>1506. T. Walker.<br>1507. W. Baker.<br>1517. W. Howells.<br>1525. J. Dewick.<br>1527. J. Ramsbottom.<br>1529. J. Joyce and A. Morley.<br>1539. D. C. Dinsmore. | 1541. H. Creaser.<br>1549. M. Cartwright.<br>1587. J. Newh u.e.<br>1633. B. Lamb rt.<br>1641. J. Birrell-haw.<br>1779. G. H. Birkbeck.<br>1893. J. F. Kunitin.<br>2363. A. Warner.<br>2645. W. E. Newton. |
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#### PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[From Gazette, December 14th, 1860.]

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| December 10th.<br>3174. H. Desmouvis.<br>December 11th.<br>3068. H. D. P. Cunningham. | December 12th.<br>3076. W. Smith.<br>3195. H. Hanson. |
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[From Gazette, December 18th, 1860.]

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| December 13th.<br>3161. G. Burl y.<br>December 14th.<br>3078. J. Bradley. | December 14th.<br>3084. T. Howard.<br>December 15th.<br>3145. G. Bridge and J. Hamer. |
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#### PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[From Gazette, December 14th, 1860.]

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|-------------------------------------|---------------------------------------|
| December 11th.<br>2892. C. Schiele. | December 12th.<br>2942. J. Greenwood. |
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[From Gazette, December 18th, 1860.]

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| December 14th.<br>2951. A. E. L. Bellford. | December 15th.<br>2956. J. L. Clark. |
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